United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States
Department of Agriculture,
Forest Service, the
South Carolina Agricultural
Experiment Station, and the
South Carolina
Land Resources
Conservation Commission

Soil Survey of Sumter National Forest Area, Oconee County, South Carolina

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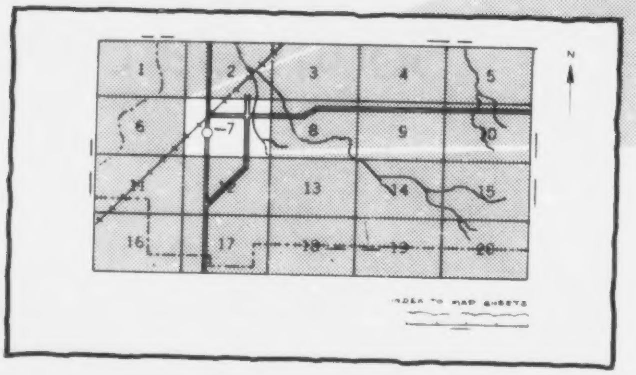
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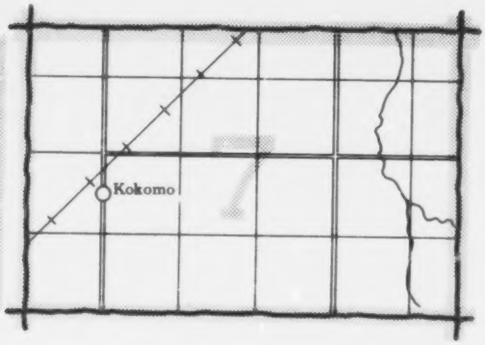

2. Note the number of the map sheet and turn to that sheet.

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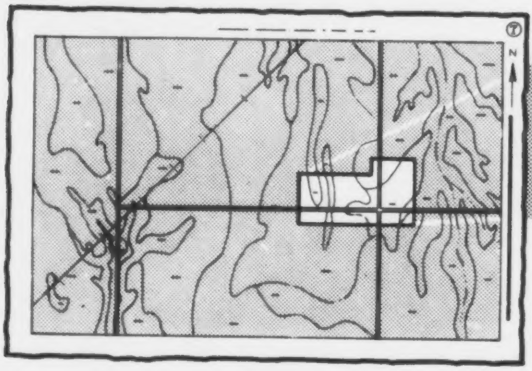

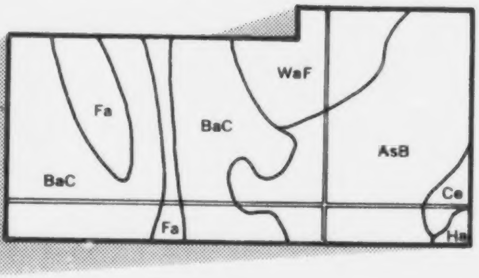
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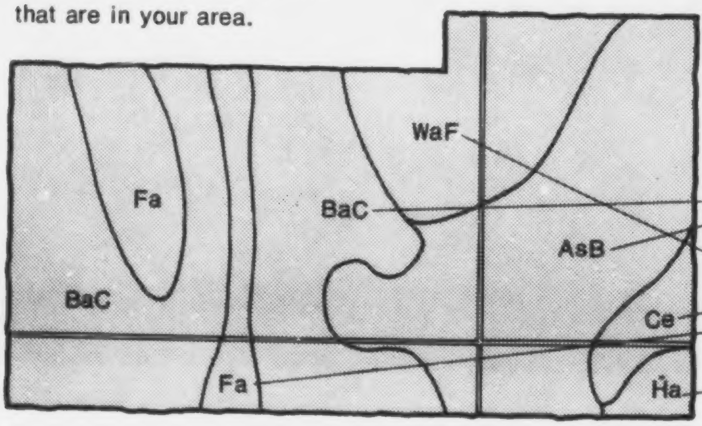
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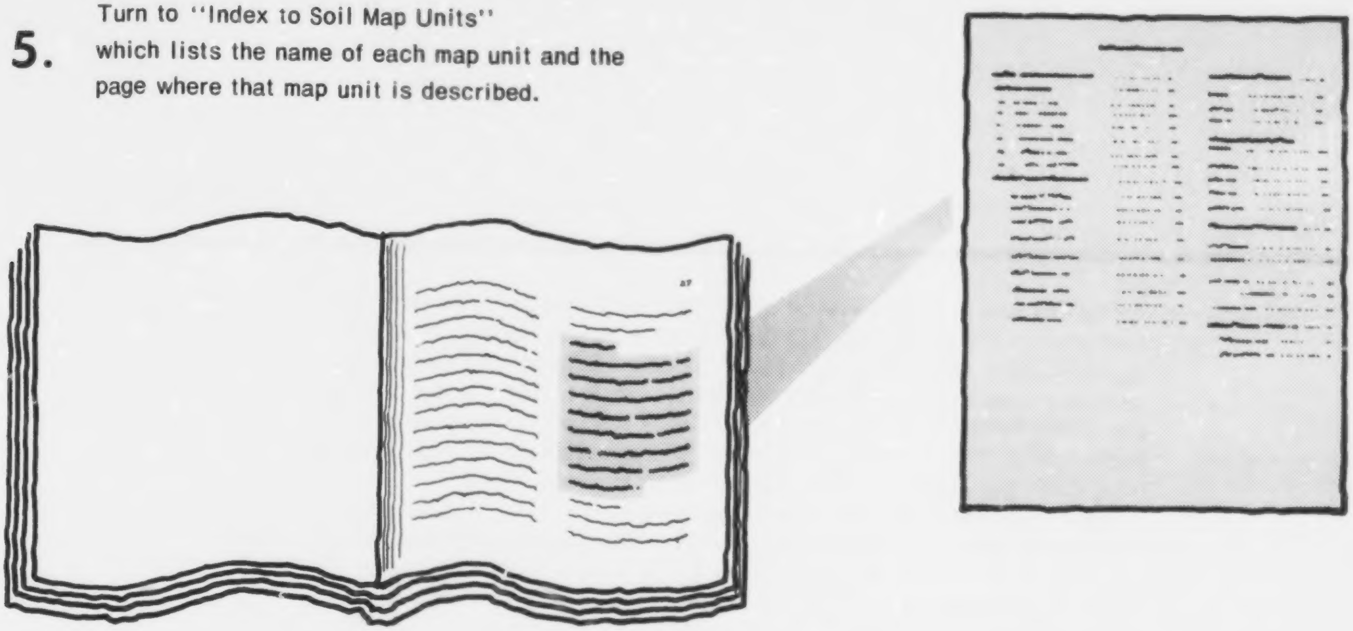
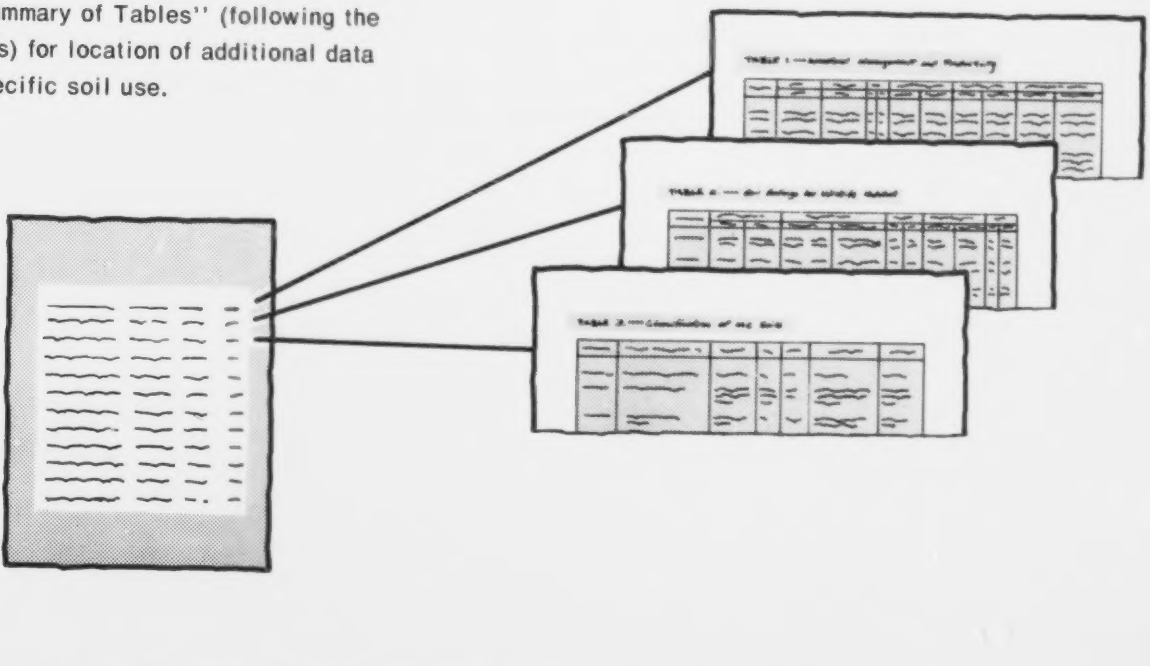
THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service and the Forest Service, the South Carolina Agricultural Experiment Station, and the South Carolina Land Resources Conservation Commission. It is part of the technical assistance furnished to the Oconee Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: The Chattooga River forms the western boundary of the Andrew Pickens Ranger District. Good management of the watershed protects soil and water resources.

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Foreword

This soil survey contains information that can be used in land-planning programs in the Sumter National Forest Area of Oconee County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

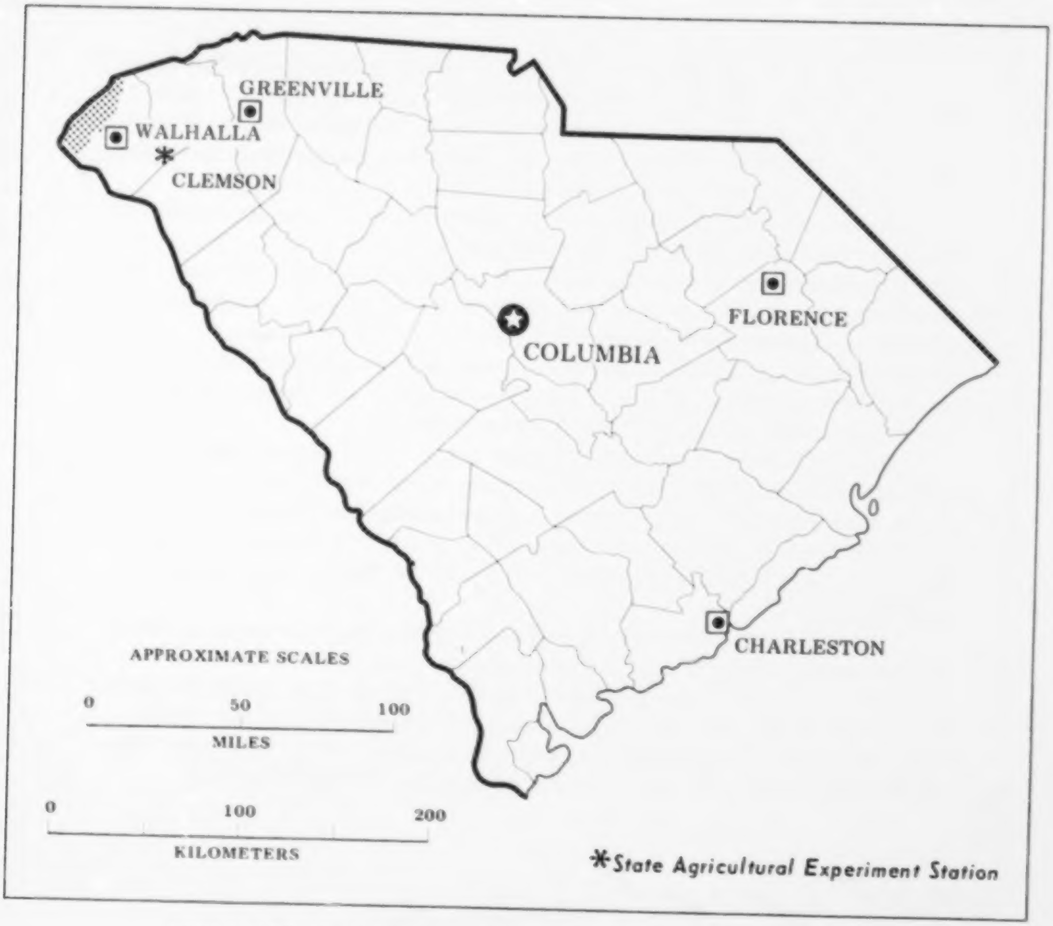
This soil survey is designed for many different users. Foresters, recreation planners, and wildlife biologists can use it to evaluate the potential of the soil and the management needed for maximum use and production. Planners and engineers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Billy J. Abercrombie

Billy J. Abercrombie
State Conservationist
Soil Conservation Service


GREENVILLE
WALHALLA
CLEMSON
COLUMBIA
FLORENCE
CHARLESTON
APPROXIMATE SCALES
0
50
100
MILES
0
100
200
KILOMETERS
*State Agricultural Experiment Station

Location of Sumter National Forest Area in Oconee County, South Carolina.

Soil Survey of
Sumter National Forest Area Oconee County, South Carolina

By Edward C. Herren, Soil Conservation Service, and
Dennis Law, Forest Service

Soils surveyed by Edward C. Herren and Gilbert W. Hurt,
Soil Conservation Service, and Dennis Law, Forest Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
United States Department of Agriculture, Forest Service,
the South Carolina Agricultural Experiment Station,
and the South Carolina Land Resources Conservation Commission

The Andrew Pickens Ranger District of Sumter National Forest is entirely within Oconee County in the extreme northwestern part of South Carolina. The survey area is made up of about 75,000 acres of national forest land.

A soil survey of Oconee County (*6*) was published in 1958. This survey updates part of that soil survey and provides additional information.

The mountainous terrain of the survey area rises from the Piedmont Plateau. The topography is rugged, with numerous sharp ridges and narrow valleys. Elevations range from 700 feet to 3,200 feet. The main drainage systems in the area are the Chattooga, Chauga, and Keowee watersheds, which are part of the Savannah River drainage basin.

Although this area is part of the Appalachian greenbelt, one of the most extensive hardwood forest ecosystems in the world, pine and pine-hardwood cover types predominate. Shortleaf and loblolly pine are on many of the ridgetops and upper slopes. Yellow-poplar, white oak, red oak, and hickory are mixed with the pine stands on the lower slopes and in coves. Most of the land was cut over before it was acquired by the Forest Service, leaving only the poorest grade hardwoods. Over the years, cuts have been designed to improve stocking and species composition, but most of the area will not reach potential productivity until the existing low-grade trees are removed and replaced with high-quality, vigorous trees.

General Nature of the Survey Area

This section gives general information about the survey area. It discusses the area's history and climate.

History of the Area

The area was settled in the 1740's by Scotch-Irish and English settlers from Virginia. The settlers found vast pine and hardwood forests occupied by the Cherokee Indians. The settlers burned forests to clear fields, improve grazing, and open up the woods for easier passage. By the early 1900's, indiscriminate cutting, burning, grazing, and cultivation had caused widespread destruction of the forests.

Purchase of land in this area for preservation as a national forest began in 1913. Fire protection initiated at that time began to bring an end to indiscriminate burning. Government sales of timber in small quantities began in 1920. In 1926, nearly 18,000 acres purchased from a local timber company was added to Sumter National Forest.

Chestnut blight ravaged the area in the 1930's. By 1938, nearly all the chestnut trees were dead. Volume loss, however, was slight; the 1934-35 timber inventory taken by the Forest Service indicated that less than one-half of one percent of the sawtimber volume was chestnut, including that alive and dead. Littleleaf disease of shortleaf pine had caused moderate losses in some localities by 1960. This disease continued to cause damage, leading to extensive salvage and regeneration cutting throughout the 1960's. Much of the regenerated area was planted to loblolly pine, which is more resistant to littleleaf disease.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Clayton, Georgia, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 41 degrees F, and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Clayton on January 30, 1966, is -7 degrees. In summer the average temperature is 72 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Clayton on July 28, 1952, is 100 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 72 inches. Of this, 35 inches, or almost 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 29 inches. The heaviest 1-day rainfall during the period of record was 8 inches at Clayton on October 4, 1964. Thunderstorms occur on about 50 days each year, and most occur in summer.

The average seasonal snowfall is 6 inches. The greatest snow depth at any one time during the period of record was 8 inches. On an average, at least 1 inch of snow is on the ground for 1 day. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 9 miles per hour, late in winter and early in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, clearings, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of small areas or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Each map unit is rated for *woodland, wildlife habitat,* and *recreation areas*. Woodland refers to areas of native or introduced trees. Intensive, or developed, recreation areas are campsites, picnic areas, and trails and other areas that are subject to heavy foot traffic. Extensive, or dispersed, recreation areas are those used for nature study and as wilderness.

Soil Descriptions

1. Toccoa

Deep, nearly level and gently sloping, well drained soils that have a loamy surface layer and a loamy substratum; on bottom lands

This map unit makes up about 2 percent of the survey area. It is about 88 percent Toccoa and similar soils and 12 percent soils of minor extent.

Toccoa soils have a surface layer of grayish brown and brown fine sandy loam and a substratum of strong brown, yellowish brown, or brown sandy loam.

The minor soils in this map unit are in the Brevard, Edneytown, Evard, and Transylvania series.

The soils in this map unit are used mainly for woodland, but in some areas they are used for wildlife habitat. They are well suited to woodland. They are well suited to openland and woodland wildlife habitat and very poorly suited to wetland wildlife habitat. These soils are well suited to picnic areas and paths and trails. They are poorly suited to septic tank absorption fields, dwellings without basements, and roads because of the hazard of occasional flooding.

2. Edneytown-Evard-Hayesville

Deep, sloping to steep, well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

This map unit makes up about 2 percent of the survey area. It is about 35 percent Edneytown soils, 30 percent Evard soils, and 25 percent Hayesville soils. The remaining 10 percent is soils of minor extent.

Edneytown soils have a yellowish brown or strong brown loamy subsoil. Evard soils have a yellowish red or red loamy subsoil. Hayesville soils have a red clayey subsoil.

The minor soils in this map unit are in the Brevard, Saluda, and Walhalla series.

The soils in this map unit are used mainly for woodland. They are well suited to woodland. They are very poorly suited to openland and wetland wildlife habitat and well suited to woodland wildlife habitat. These soils are fairly well suited to camp areas, picnic areas, and paths and trails. They are poorly suited to septic tank absorption fields, dwellings without basements, and roads because of slope.

3. Evard

Deep, sloping to steep, well drained soils that have a loamy surface layer and a loamy subsoil; on uplands

This map unit makes up about 73 percent of the survey area. It is about 73 percent Evard soils and 27 percent soils of minor extent.

Evard soils have a yellowish red or red loamy subsoil.

The minor soils in this map unit are in the Edneytown, Brevard, Hayesville, Toccoa, Walhalla, and Saluda series.

The soils in this map unit are used mainly for woodland. They are well suited to woodland. They are very poorly suited to wetland and openland wildlife habitat and well suited to woodland wildlife habitat. These soils are fairly well suited to camp areas, picnic areas, and paths and trails. They are poorly suited to septic tank absorption fields, dwellings without basements, and roads because of slope.

4. Evard-Edneytown

Deep, very steep, well drained soils that have a loamy surface layer and a loamy subsoil; on uplands

This map unit makes up about 23 percent of the survey area. It is about 60 percent Evard soils, 20 percent Edneytown soils, and 20 percent soils of minor extent.

Evard soils have a yellowish red or red loamy subsoil. Edneytown soils have a strong brown or yellowish brown loamy subsoil.

The minor soils in this map unit are in the Brevard, Saluda, Hayesville, and Walhalla series.

The soils in this unit are used mainly for woodland. They are fairly well suited to woodland. They are poorly suited to openland and wetland wildlife habitat and well suited to woodland wildlife habitat. These soils are very poorly suited to camp areas and picnic areas, and they are poorly suited to paths and trails. They are also very poorly suited to septic tank absorption fields, dwellings without basements, and roads. The suitability of these soils is limited because of the very steep slope.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Evard fine sandy loam, 25 to 50 percent slopes, is one of several phases in the Evard series.

Some map units are made up of two or more major soils. These map units are called soil associations.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Edneytown-Saluda association, 50 to 80 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

3B—Edneytown fine sandy loam, 2 to 7 percent slopes. This deep, well drained, gently sloping soil is mostly on narrow, irregular ridgetops. Individual areas are about 5 to 30 acres.

In a typical profile, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles. The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Included in mapping are a few small areas of Brevard and Hayesville soils. Also included are small areas where slope is more than 7 percent. These inclusions make up about 5 percent of the map unit.

This Edneytown soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is medium, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as moving logs on the contour. Skidtrails, log landings, and temporary logging roads should be placed so that they do not lead to drainageways. Plowing firelines on the contour reduces erosion. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also reduce erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of

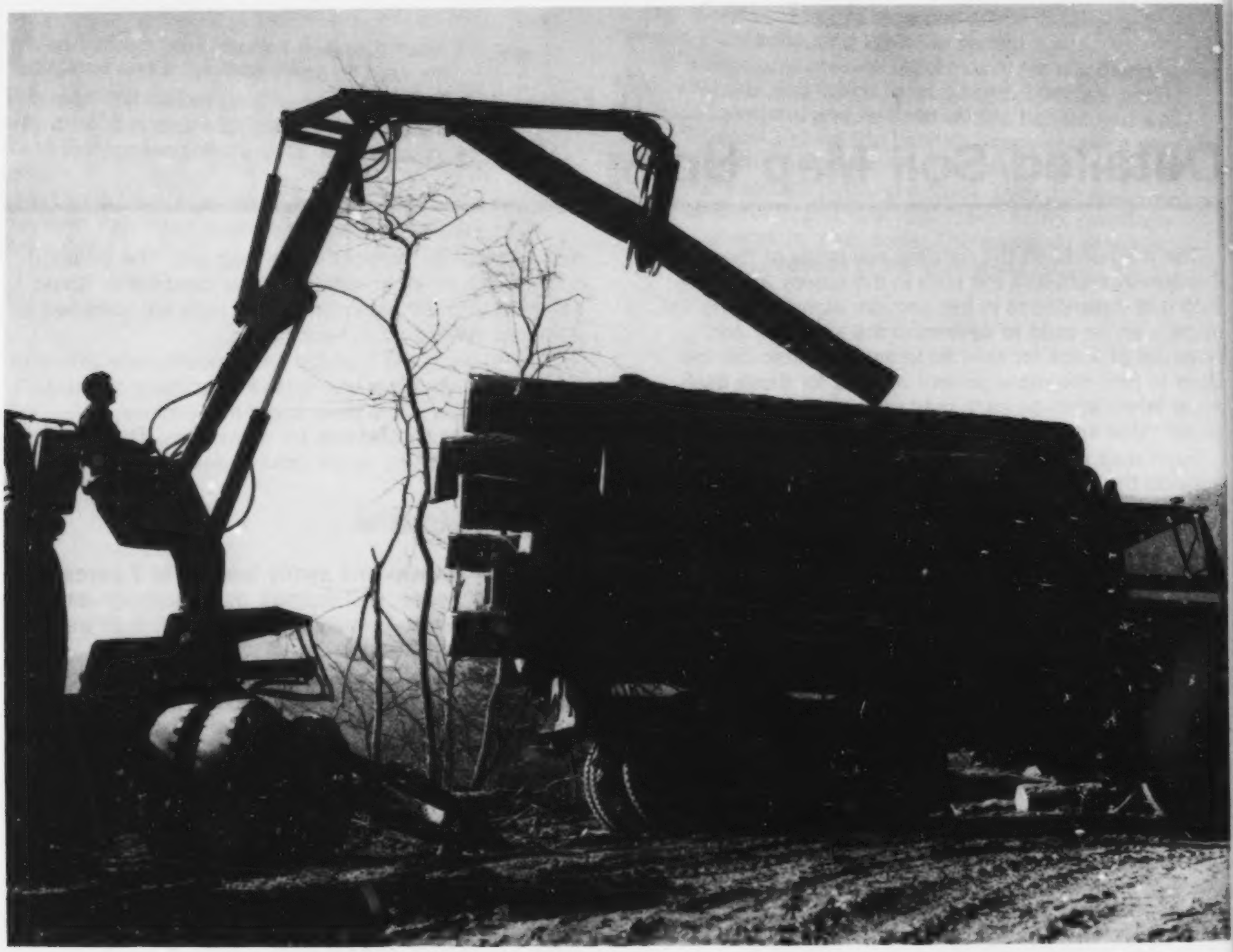


Figure 1.—Locating log landing areas on Edneytown fine sandy loam, 2 to 7 percent slopes, minimizes downtime after wet weather.

site preparation. Sites available for log landings are common (fig. 1).

This soil is well suited to recreation uses, such as campsites, picnic areas, and paths and trails.

This soil is well suited to engineering uses. It has few or no limitations to these uses. This soil is well suited to use as roadfill.

This soil is well suited to openland wildlife habitat and woodland wildlife habitat, and it is very poorly suited to wetland wildlife habitat. The dominant game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

3C—Edneytown fine sandy loam, 7 to 15 percent slopes. This deep, well drained, sloping to strongly sloping soil is mostly on narrow, irregular ridgetops. Individual areas are about 5 to 30 acres.

In a typical profile, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles.

The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Included in mapping are a few small areas of Brevard, Hayesville, and Walhalla soils. Also included are small areas where slope is more than 15 percent. These inclusions make up about 5 percent of the map unit.

This Edneytown soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails, log landings, and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation. Sites available for log landings are common in areas where slopes are less than 8 percent.

This soil is fairly well suited to campsites and picnic areas and well suited to trails and paths. Grading may be needed in some areas to reduce the slope. Placing trails on the contour reduces erosion and maintenance.

This soil is fairly well suited to engineering uses. Slope is a moderate limitation for roads, sanitary facilities, and small buildings. Vegetative cover is difficult to establish on roadcuts more than 3 feet deep. This soil material is well suited to use as roadfill. Constructing roads on grades of less than 10 percent reduces the risk of erosion and reduces maintenance.

This soil is well suited to openland and woodland wildlife habitat and very poorly suited to wetland habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

3D—Edneytown fine sandy loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is mostly on narrow, irregular ridgetops and side slopes adjacent to drainageways. Individual areas are about 5 to 30 acres.

In a typical profile, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles. The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Included in mapping are a few small areas of Brevard, Hayesville, and Walhalla soils. Also included are a few small areas where slope is more than 25 percent. These inclusions make up about 5 percent of the map unit.

This Edneytown soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland use. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation.

This soil is poorly suited to campsites and picnic areas and fairly well suited to trails and paths. Campsites and picnic areas can be developed with extensive grading and cutting and filling to reduce the slope. Revegetating cut and filled areas reduces the erosion hazard. Campsites and picnic areas are somewhat better suited in the less sloping areas. Placing trails on the contour reduces erosion and maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads because of slope. Vegetative cover is difficult to establish on roadcuts more than about 3 feet deep. This soil is only fairly well suited to use as roadfill because of the moderately steep slope. Constructing roads on grades of less than 10 percent reduces the risk of erosion and reduces maintenance.

This soil is fairly well suited to openland wildlife habitat, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2r.

3E—Edneytown fine sandy loam, 25 to 50 percent slopes. This deep, well drained, steep soil is on narrow, irregular ridgetops and side slopes adjacent to drainageways. Individual areas are about 15 to 80 acres.

In a typical profile, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles. The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Included in mapping are a few small areas of Brevard, Hayesville, Saluda, and Walhalla soils. Also included are a few small areas where slope is more than 50 percent. These inclusions make up about 5 percent of the map unit.

This Edneytown soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is high.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing minimize erosion.

Site-preparation burning and chopping are acceptable methods of site preparation in areas where slope is not more than 40 percent. Handtools are used for site preparation in areas where slope is more than 40 percent. Cable logging or aerial logging is used in areas where slope is more than 40 percent. Log landing sites are generally located only on ridgetops.

This soil is poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails. Campsites and picnic areas can be established if extensive grading is used to reduce the slope. Placing paths and trails on the contour reduces the risk of erosion and reduces maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads because of slope. Roads placed on the contour have less of an erosion hazard. Vegetative cover is difficult to establish on roadcuts more than about 3 feet deep. This soil is poorly suited to use as roadfill because of slope.

This soil is poorly suited to openland wildlife habitat and very poorly suited to wetland wildlife habitat. It is well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. In all areas with slope up to 40 percent, prescribed burning can be used to improve wildlife habitat. Prescribed burning can also be used in areas where slope is more than 40 percent if the total slope length is less than 150 feet. Handtools are needed to construct firelines in the areas where slope is more than 40 percent.

The woodland ordination symbol is 2r.

3F—Edneytown fine sandy loam, 50 to 80 percent slopes. This deep, well drained, very steep soil is on side slopes adjacent to drainageways. Individual areas are about 10 to 80 acres.

In a typical profile, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles. The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Included in mapping are a few small areas of Brevard, Hayesville, Saluda, and Walhalla soils. Also included are a few small areas where slope is more than 80 percent. These inclusions make up about 10 percent of the map unit.

This Edneytown soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is very high.

This soil is fairly well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. The very steep slope is the main limitation to woodland use. Site-preparation burning is not used on this soil because of the risk of erosion and the difficulty of controlling the fire. Acceptable methods of site preparation are the use of handtools and aerial spraying. Acceptable methods of logging on this soil are cable logging and aerial logging. Log landing sites generally must be located in the less sloping areas.

This soil is very poorly suited to recreation uses, such as campsites and picnic areas and paths and trails, because of the very steep slope. If this soil is used for campsites and picnic areas, extensive grading and revegetation are needed, and the risk of erosion is very high. This soil can be used for paths and trails if the paths and trails are placed on the contour and no cutting and filling is used. Paths and trails on this soil need extensive maintenance. Vegetation is difficult to establish in cut and filled areas.

This soil is very poorly suited to engineering uses. It is severely limited as a site for small buildings, roads, and sanitary facilities because of the very steep slope. This soil can be used as a site for roads if extensive grading and revegetative practices are used, but the risk of erosion is very high. Roads and roadbanks in areas of this soil require extensive maintenance. Vegetation is difficult to establish, especially in cut or filled areas. This soil is poorly suited to use as roadfill because of the very steep slope.

This soil is poorly suited to openland wildlife habitat, very poorly suited to wetland wildlife habitat, and well

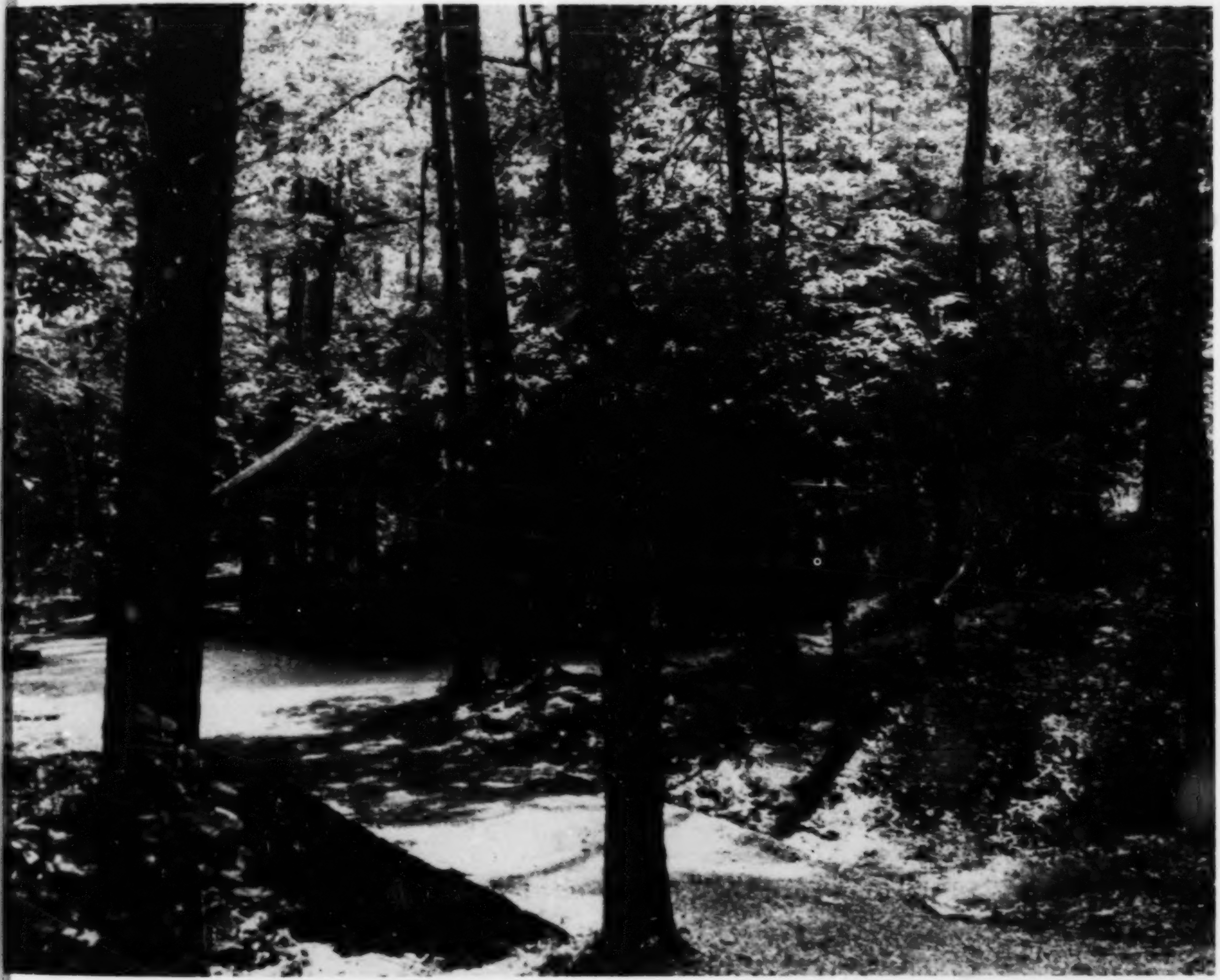


Figure 2.—This area of the well drained Evard fine sandy loam, 7 to 15 percent slopes, is an ideal location for recreation facilities.

suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. Prescribed burning to improve wildlife habitat is not used on this soil because of the risk of erosion and the difficulty of controlling the fire.

The woodland ordination symbol is 3r.

6C—Evard fine sandy loam, 7 to 15 percent slopes. This deep, well drained, sloping to strongly sloping soil is mostly on narrow, irregular ridgetops. Individual areas are about 5 to 80 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is red sandy clay loam to a depth of 29 inches, and from 29 to 37 inches it is red loam. The substratum from 37 to 72 inches is yellowish red and reddish brown loam.

Included in mapping are a few small areas of Brevard, Walhalla, Hayesville, and Saluda soils. Also included are small areas where slope is more than 15 percent. These inclusions make up about 10 percent of the soils in the map unit.

This Evard soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails, log landings, and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation.

This soil is fairly well suited to campsites and picnic areas and well suited to trails and paths (fig. 2). Grading may be needed in some areas to reduce the slope. Placing trails on the contour reduces erosion and maintenance.

This soil is fairly well suited to engineering uses. It is moderately limited for use as a site for roads, small buildings, and sanitary facilities because of slope. Vegetative cover is difficult to establish on roadcuts more than about 3 feet deep. This soil is well suited to use as roadfill. Constructing roads on grades of less than 10 percent reduces the risk of erosion and reduces maintenance.

This soil is well suited to openland and woodland wildlife habitat (fig. 3). It is very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. Populations of quail and dove increase in areas cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

6D—Evard fine sandy loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is

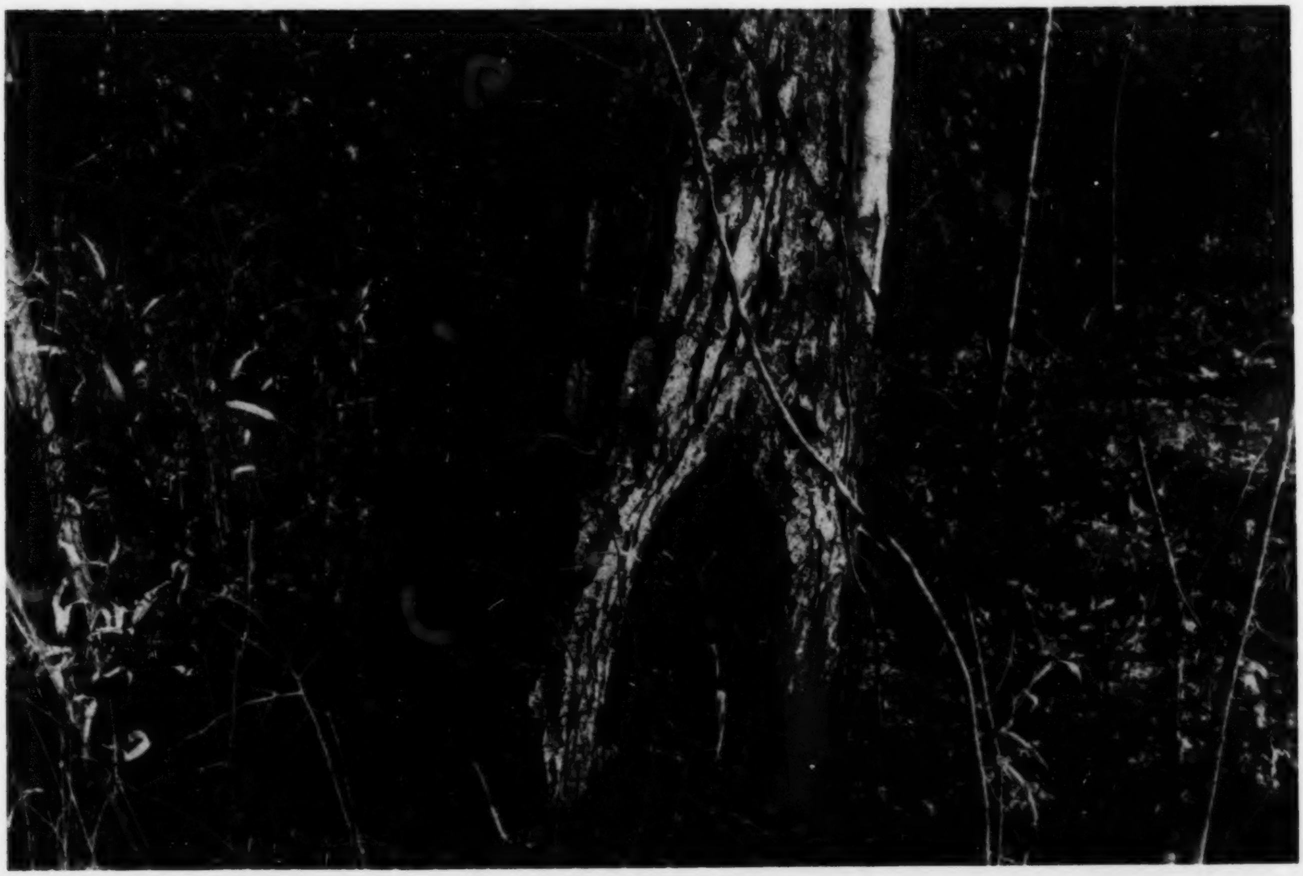


Figure 3.—Den trees on Evard fine sandy loam, 7 to 15 percent slopes, provide nesting sites for small mammals in key wildlife areas.

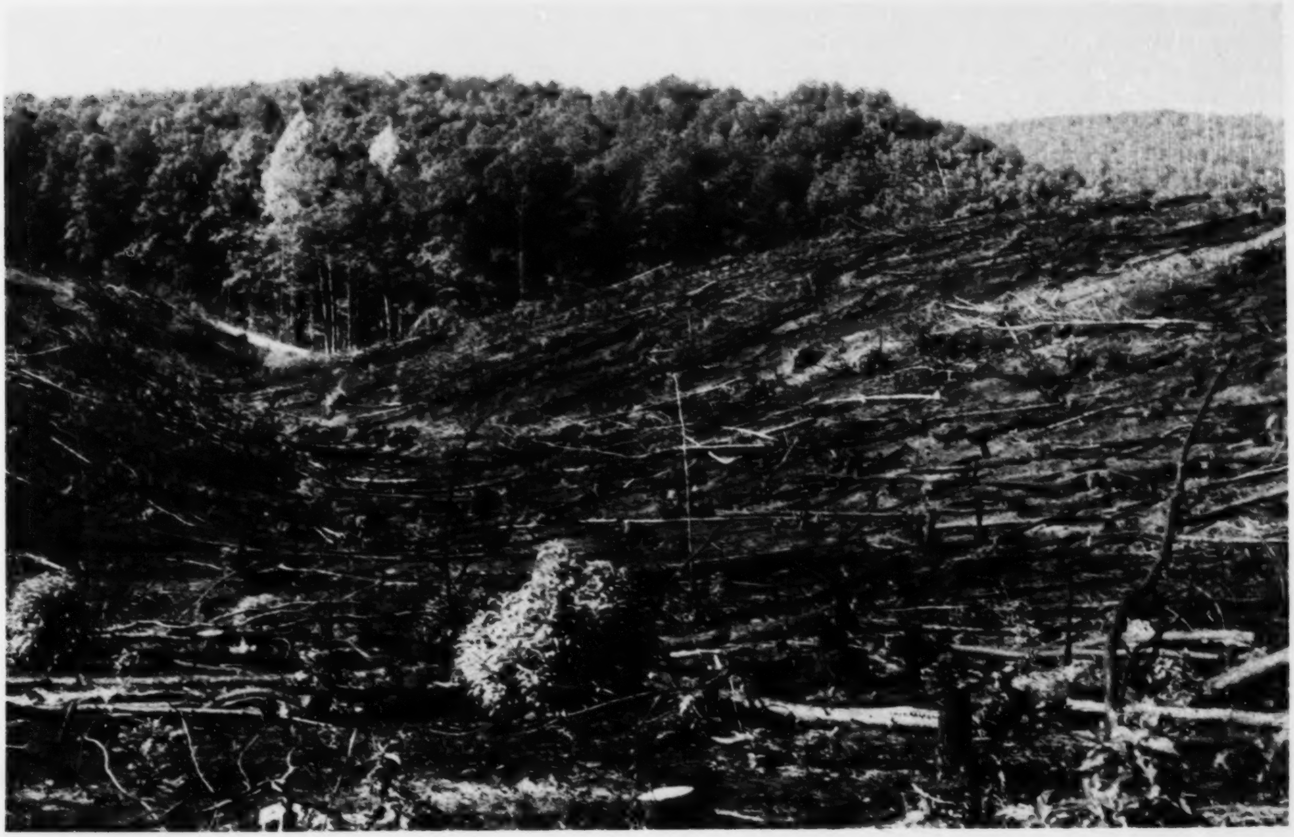


Figure 4.—Site-preparation burns reduce competing vegetation following regeneration harvest. Pine seedlings have been planted in this area of Evard fine sandy loam, 15 to 25 percent slopes.

on narrow, irregular ridgetops and along drainageways. Individual areas are about 5 to 100 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is red sandy clay loam to a depth of 29 inches, and from 29 to 37 inches it is red loam. The substratum from 37 to 72 inches is yellowish red and reddish brown loam.

Included in mapping are a few small areas of Brevard, Walhalla, Hayesville, and Saluda soils. Also included are small areas where slope is more than 25 percent. These inclusions make up about 10 percent of the map unit.

This Evard soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so they do not have a gradient of more than 10 percent and do not lead to drainageways, and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning (fig. 4) and chopping are acceptable methods of site preparation.

This soil is poorly suited to recreation uses, such as campsites and picnic areas, and fairly well suited to trails and paths. Campsites and picnic areas can be established if extensive grading and cutting and filling are used to reduce the slope. Revegetating cut and filled areas reduces erosion. Campsites and picnic areas are somewhat better suited in the less sloping areas. Placing trails on the contour reduces both erosion and maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads, small buildings, and sanitary facilities because of slope. Vegetative cover is difficult to establish on the lower part of roadcuts more than about 3 feet deep. This soil is only fairly well suited to use as roadfill because of the moderately steep slope. Constructing roads on the contour with grades of less than 10 percent minimizes the risk of erosion and maintenance.

This soil is fairly well suited to openland wildlife habitat, very poorly suited to wetland wildlife habitat, and well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2r.

6E—Evard fine sandy loam, 25 to 50 percent slopes. This deep, well drained, steep soil is on narrow irregular ridgetops and drainageways. Individual areas are about 15 to 200 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is red sandy clay loam to a depth of 29 inches, and from 29 to 37 inches it is red loam. The substratum from 37 to 72 inches is yellowish red and reddish brown loam.

Included in mapping are a few small areas of Brevard, Walhalla, Edneytown, Hayesville, and Saluda soils. Also included are small areas where slope is more than 50 percent. These inclusions make up about 10 percent of the map unit.

This Evard soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is high.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing minimize erosion.

Handtools are used for site preparation in areas where slope is more than 40 percent. Cable logging and aerial logging can be used in areas where slope is 40 percent or more. The most suitable log landing sites are on ridgetops.

This soil is poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails. If this soil is used for campsites, picnic areas, and paths and trails, slope is the main limitation. Campsites and picnic areas can be established, but extensive grading is needed to reduce the slope. Revegetating cut and filled areas reduces the erosion hazard. Locating paths and trails on the contour also reduces the risk of erosion and reduces maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for small buildings, roads, and sanitary facilities because of slope. Roads should be placed on the contour. Small buildings and sanitary facilities can be constructed if the site is graded. Establishing vegetation in cut and filled areas reduces the erosion hazard. Vegetative cover is difficult to establish on roadcuts more than about 3 feet deep. This soil is poorly suited to use as roadfill because of the steep slope. Constructing roads on grades of less than 10 percent reduces the need for maintenance.

This soil is poorly suited to openland wildlife habitat, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. In all areas with slope up to 40 percent, prescribed burning can be used to improve wildlife habitat. Prescribed burning can also be used in areas where slope is more than 40 percent if the total length of the slope is less than 150 feet. Handtools are needed to construct firelines in areas where slope is more than 40 percent.

The woodland ordination symbol is 2r.

6F—Evard fine sandy loam, 50 to 80 percent slopes. This deep, well drained, very steep soil is on side slopes adjacent to drainageways. Individual areas are about 10 to 150 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is red sandy clay loam to a depth of 29 inches, and from 29 to 37 inches it is red loam. The substratum from 37 to 72 inches is yellowish red and reddish brown loam.

Included in mapping are a few small areas of Brevard, Walhalla, Hayesville, and Saluda soils. Also included are a few small areas where slope is more than 80 percent. These inclusions make up about 10 percent of the map unit.

This Evard soil is moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is very high.

This soil is fairly well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. The very steep slope is the main limitation to woodland use. Site-preparation burning is not used on this soil because of the risk of erosion and the difficulty of controlling the fire. Acceptable methods of site preparation are the use of handtools and aerial spraying. Acceptable methods of

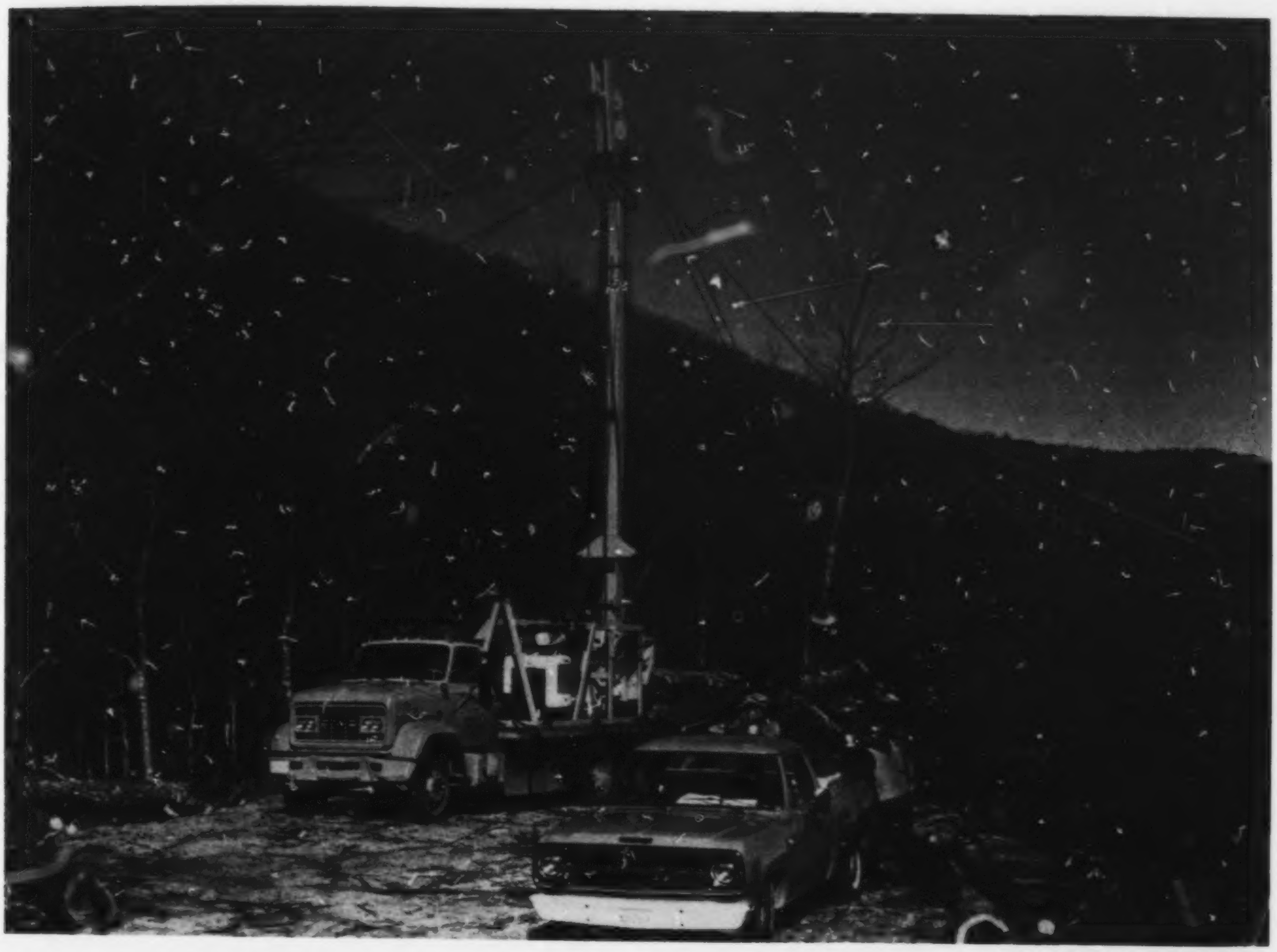


Figure 5.—Cable logging reduces the impact of logging on Evard fine sandy loam, 50 to 80 percent slopes.

logging on this soil are cable logging (fig. 5) and aerial logging. Log landing sites generally must be located in adjacent, less sloping areas.

This soil is very poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails, because of the very steep slope. It is generally not used for campsites and picnic areas. If this soil is used for campsites and picnic areas, extensive grading and revegetation are needed and the risk of erosion is very high. This soil can be used for paths and trails if the paths and trails are placed on the contour and if no cutting and filling is used. Paths and trails on this soil require extensive maintenance. Vegetation is difficult to establish in cut and filled areas.

This soil is very poorly suited to engineering uses, such as sites for small buildings, roads, and sanitary facilities, because of the very steep slope. This soil can be used for roads if extensive grading and revegetation are used, but the risk of erosion is very high. Roads and roadbanks in areas of this soil require extensive maintenance. Vegetation is difficult to establish, especially in cut or filled areas. This soil is poorly suited to use as roadfill because of the very steep slope.

This soil is poorly suited to openland wildlife habitat, very poorly suited to wetland wildlife habitat, and well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. Prescribed burning to improve wildlife habitat is not used on this soil because of the risk of erosion and the difficulty of controlling fire.

The woodland ordination symbol is 3r.

7C—Brevard fine sandy loam, 7 to 15 percent slopes. This deep, well drained, sloping to strongly sloping soil is on foot slopes and benches and in coves. This soil is subject to slippage and slumping. Individual areas are about 4 to 20 acres.

In a typical profile, the surface layer is brown fine sandy loam about 3 inches thick, and the subsurface layer is yellowish brown fine sandy loam about 3 inches thick. The subsoil from 6 to 72 inches is yellowish red or red clay loam or sandy clay loam.

Included in mapping are a few small areas of Edneytown, Evard, Hayesville, Toccoa, and Transylvania soils. Also included are a few small areas where slope is more than 15 percent. These inclusions make up about 8 percent of the map unit.

This Brevard soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland use. It has the potential for producing high-quality hardwood and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails (fig. 6) and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing firelines immediately after plowing also minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of

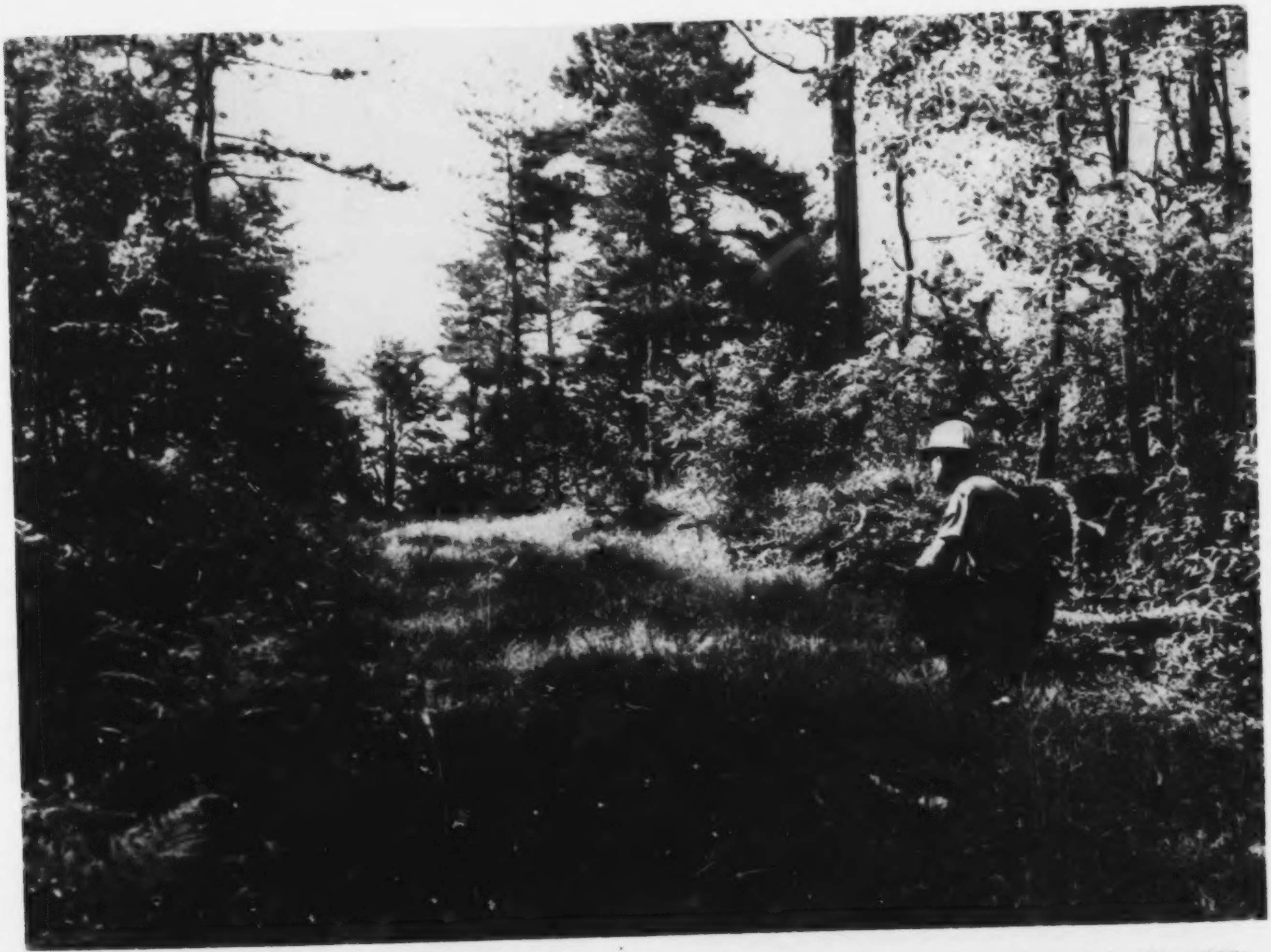


Figure 6.—This skidtrail on Brevard fine sandy loam, 7 to 15 percent slopes, is seeded to prevent erosion and provide food for wildlife.

site preparation. Sites for log landings are common in areas where slope is less than 8 percent.

This soil is fairly well suited to such recreation uses as campsites and picnic areas and is well suited to trails and paths. Cutting and filling may be needed in some areas to reduce the slope but should be avoided, if possible. Placing trails on the contour reduces erosion and maintenance.

This soil is fairly well suited to engineering uses. It is moderately limited for use as a site for roads, sanitary facilities, and small buildings because of slope. This soil is poorly suited to use as roadfill because of its low strength.

This soil is well suited to openland and woodland wildlife habitat and is very poorly suited to wetland wildlife habitat. Wildlife open areas should be located in areas where slope is less than 10 percent. The dominant game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

7E—Brevard fine sandy loam, 15 to 50 percent slopes. This deep, well drained, moderately steep and steep soil is on foot slopes and benches and in coves. This soil is subject to slippage and slumping. Individual areas are about 4 to 20 acres.

In a typical profile, the surface layer is yellowish brown fine sandy loam about 3 inches thick. The subsurface layer, from 3 to 6 inches, is yellowish brown fine sandy loam. The subsoil from 6 to 72 inches is yellowish red or red clay loam or sandy clay loam.

Included in mapping are a few small areas of Edneytown, Evard, Hayesville, Toccoa, and Transylvania soils. Also included are a few small areas where slope is more than 50 percent. These inclusions make up about 10 percent of the map unit.

This Brevard soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is high.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation in areas where slope is not more than 40 percent. Handtools are used for site preparation in areas where slope is more than 40 percent. Cable logging or aerial logging is used in areas where slope is more than 40 percent. Log landing sites are generally not located on this soil.

This soil is poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails. Campsites and picnic areas can be developed with extensive grading to reduce the slope. Placing paths and trails on the contour reduces the risk of erosion and reduces maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads because of slope. Roads placed on the contour have less of an erosion hazard. Vegetative cover is difficult to establish on roadcuts of more than 3 feet. This soil is poorly suited to use as roadfill because of slope.

This soil is poorly suited to openland wildlife habitat and very poorly suited to wetland wildlife habitat because of slope. It is well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. In all areas with slope up to 40 percent, prescribed burning can be used to improve wildlife habitat. Prescribed burning can also be used in areas where slope is more than 40 percent if the total length of the slope is less than 150 feet. Handtools are needed to construct firelines in the areas where slope is more than 40 percent.

The woodland ordination symbol is 2r.

9B—Walhalla fine sandy loam, 2 to 7 percent slopes. This deep, well drained, gently sloping soil is mostly on narrow, irregularly shaped ridgetops. Individual areas are about 5 to 20 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red or red clay loam to a depth of 46 inches, and from 46 to 53 inches it is red fine sandy loam. The substratum from 53 to 65 inches is yellowish red sandy loamy sand with reddish yellow mottles.

Included in mapping are a few small areas of Evard, Edneytown, Brevard, and Hayesville soils. Also included are a few areas where slope is more than 7 percent. These inclusions make up about 5 percent of the map unit.

This Walhalla soil is moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is medium, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil (fig. 7), such as moving logs on the contour. Skidtrails, log landings, and temporary logging roads should be placed so they do not lead to drainageways.

Plowing firelines on the contour reduces erosion. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also reduce erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation.

This soil is well suited to recreation uses, such as campsites, picnic areas, and paths and trails.

This soil is well suited to engineering uses. It is slightly limited for these uses. This soil is well suited to use as roadfill.

This soil is well suited to openland and woodland wildlife habitat and is very poorly suited to wetland wildlife habitat. The dominant game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased in areas that are cleared of all pine and hardwood trees. Prescribed burning (fig. 8) helps to maintain and improve wildlife habitat.

The woodland ordination symbol is 2o.

9C—Walhalla fine sandy loam, 7 to 15 percent slopes. This deep, well drained, sloping to strongly sloping soil is mostly on narrow, irregularly shaped ridgetops. Individual areas are about 5 to 30 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red and red clay loam to a depth of 46 inches, and from 46 to 53 inches it is red fine sandy loam. The substratum from 53 to 65 inches is yellowish red loamy sand with reddish yellow mottles.

Included in mapping are a few small areas of Evard, Edneytown, Hayesville, and Brevard soils. Also included are a few areas where slope is more than 15 percent. These inclusions make up about 5 percent of the map unit.

This Walhalla soil is moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is high. The root zone is deep

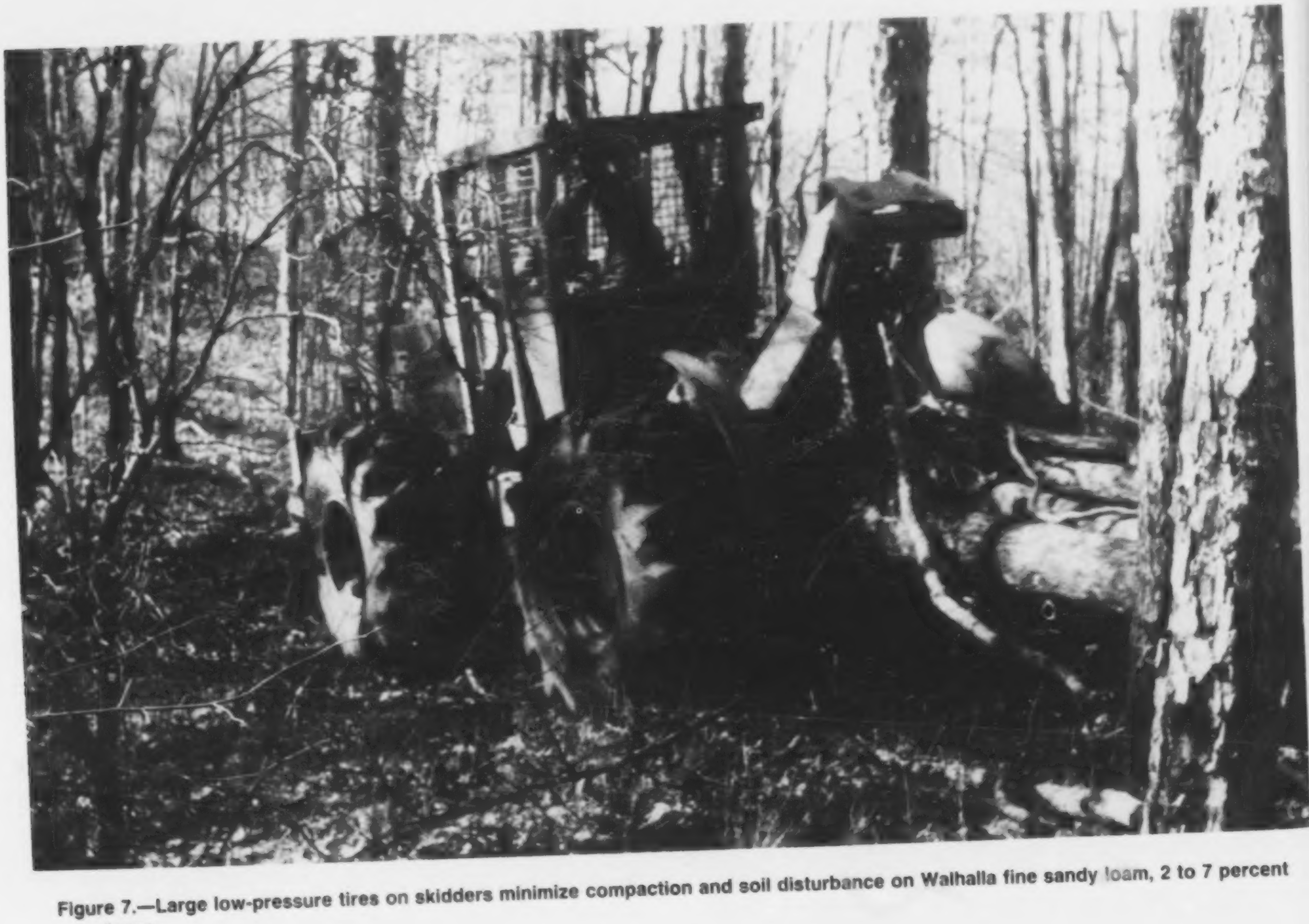


Figure 7.—Large low-pressure tires on skidders minimize compaction and soil disturbance on Walhalla fine sandy loam, 2 to 7 percent slopes.

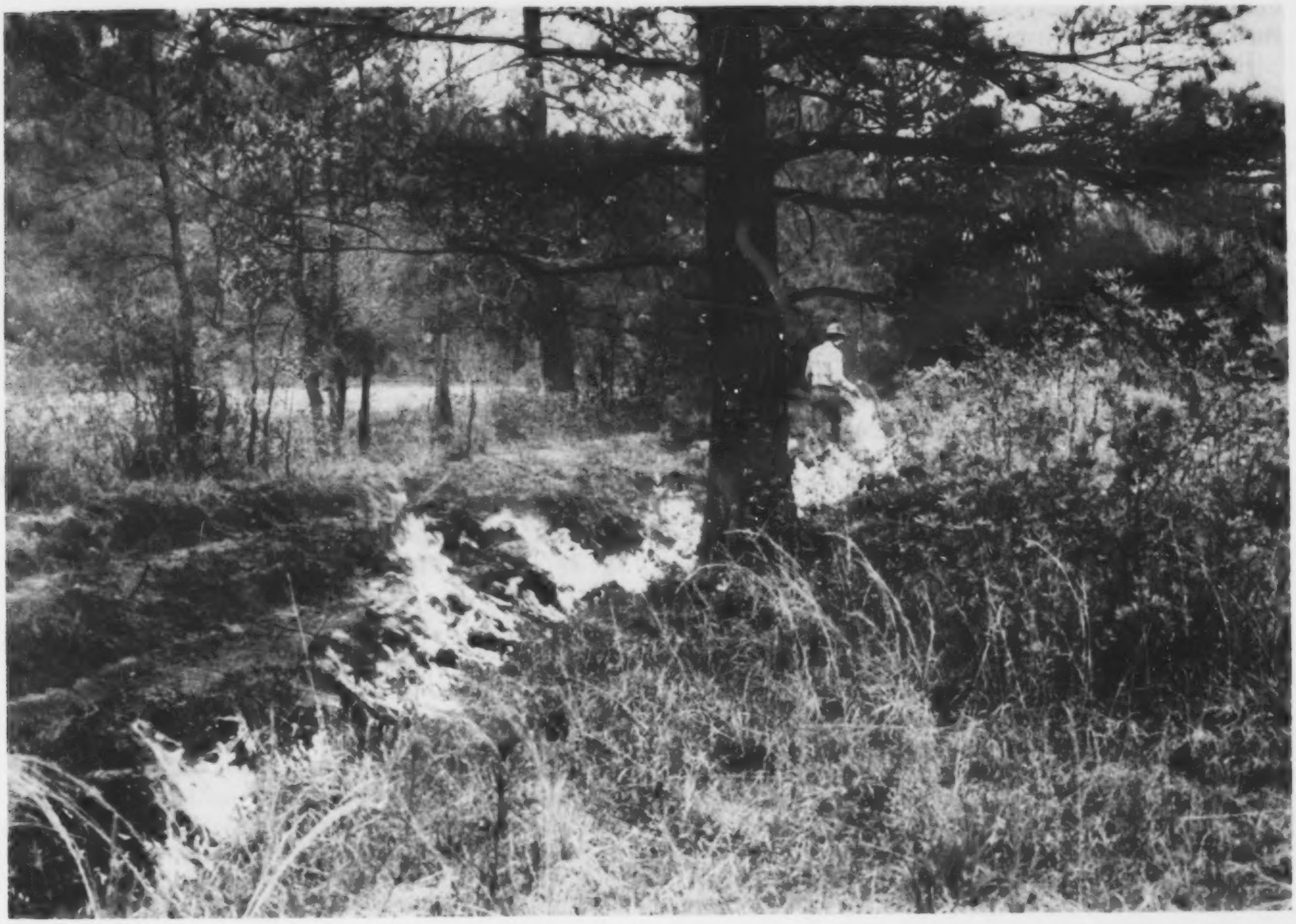


Figure 8.—Prescribed burning improves food supplies for wildlife habitat on Walhalla fine sandy loam, 2 to 7 percent slopes.

and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails, log landings, and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation.

This soil is fairly well suited to recreation uses, such as campsites and picnic areas, and well suited to trails and paths. Grading may be needed in some areas to reduce the slope. Placing trails on the contour aids in reducing erosion and maintenance.

This soil is fairly well suited to engineering uses. It is moderately limited for use as a site for roads, small buildings, and sanitary facilities because of slope. Vegetative cover is difficult to establish on the lower part of roadcuts more than about 4 feet deep. This soil is fairly well suited as a foundation base or roadfill. It is limited for these uses by slope. Constructing roads on grades of less than 10 percent minimizes erosion and maintenance.

This soil is well suited to openland and woodland wildlife habitat and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased in areas cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

9D—Walhalla fine sandy loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on narrow, irregularly shaped ridgetops and side slopes adjacent to drainageways. Individual areas are about 5 to 30 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red and red clay loam to a depth of 46 inches and from 46 to 53 inches it is red fine sandy loam. The substratum from 53 to 65 inches is yellowish red loamy sand with reddish yellow mottles.

Included in mapping are a few small areas of Evard, Edneytown, Hayesville, and Brevard soils. Also included are a few small areas where slope is more than 25 percent. These inclusions make up about 5 percent of the map unit.

This Walhalla soil is moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing firelines immediately after plowing can also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation.

This soil is poorly suited to recreation uses such as campsites and picnic areas and fairly well suited to trails and paths. If this soil is used for campsites and picnic areas, extensive grading and cutting and filling are needed to reduce the slope. Revegetating cut and filled areas reduces the hazard of erosion. Campsites and picnic areas should be located on the less sloping parts of the map unit. Placing trails on the contour reduces erosion and maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads, small buildings, and sanitary facilities because of slope. Vegetative cover is difficult to establish on roadcuts more than 4 feet deep. This soil is poorly suited to use as roadfill because of the moderately steep slope. Constructing roads on grades of less than 10 percent minimizes erosion and maintenance.

This soil is fairly well suited to openland wildlife habitat, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased in areas that are cleared of all pine and hardwood trees. Prescribed burning helps to maintain and improve wildlife habitat.

The woodland ordination symbol is 2r.

9E—Walhalla fine sandy loam, 25 to 50 percent slopes. This deep, well drained, steep to very steep soil is on narrow, irregular ridgetops and side slopes adjacent to drainageways. Individual areas are about 10 to 20 acres.

In a typical profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mostly yellowish red and red clay loam to a depth of 46 inches and from 46 to 53 inches it is red fine sandy loam. The substratum from 53 to 65 inches is yellowish red loamy sand with reddish yellow mottles.

Included in mapping are a few small areas of Brevard, Evard, Edneytown, and Hayesville soils. Also included are a few small areas where slope is more than 50 percent. These inclusions make up about 10 percent of the map unit.

This soil is moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is high.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and plowing firelines and moving logs on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation in areas where slope is not more than 40 percent. Handtools are used for site preparation in areas where slope is more than 40 percent. Cable logging, aerial logging, or tractor skidders can be used in areas where slope is more than 40 percent. Log landing sites are generally located only on ridgetops.

This soil is poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails. If campsites and picnic areas are established, extensive grading is needed to reduce the slope. Revegetating cut and filled areas reduces the hazard of erosion. Placing paths and trails on the contour reduces the risk of erosion and reduces maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for small buildings, roads, and sanitary facilities because of slope. Roads placed on the contour have less of an erosion hazard. Small buildings and sanitary facilities can be constructed if the site is graded. Establishing vegetation in cut and filled areas reduces the erosion hazard. Vegetative cover is difficult to establish on roadcuts more than 4 feet deep. This soil is poorly suited to use as roadfill because of the steep slope. Constructing roads on grades of less than 10 percent reduces the need for maintenance.

This soil is fairly well suited to openland wildlife habitat, very poorly suited to wetland wildlife habitat, and well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. In all areas where slope is no more than 40 percent, prescribed burning can be used to improve wildlife habitat. Prescribed burning can also be used in areas where slope is more than 40 percent if the total slope length is less than 150 feet. Handtools are needed to construct firelines in the areas where slopes are more than 40 percent.

The woodland ordination symbol is 2r.

12—Toccoa fine sandy loam. This deep, well drained or moderately well drained, nearly level soil is on first bottoms along the small to large streams. Individual areas are about 50 to 400 feet wide and 3 to 50 acres.

In a typical profile, the surface layer is very dark grayish brown and brown fine sandy loam about 10 inches thick. The substratum from 10 to 60 inches is yellowish brown and brown fine sandy loam.

Included in mapping are a few small areas of soils that are more poorly drained, a few small areas of soils that contain more than 18 percent clay, and a few small areas of soils that have a pebble content of 70 percent or more by volume within 40 inches of the surface. Also included are a few small areas where slope is more than 3 percent. These inclusions make up about 8 percent of the map unit.

This Toccoa soil is slightly acid to strongly acid throughout. Permeability is moderately rapid, and the available water capacity is moderate. The root zone is deep and easily penetrated by plant roots. Runoff is slow, and the potential for erosion is low. Occasionally, this soil is flooded for a brief period. Depth to the seasonal high water table is 2.5 feet to 5.0 feet from December through April.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. The use of harvesting procedures that least disturb the soil can minimize compaction, rutting, and erosion. Woodland harvesting can be timed to summer months or to periods when the soil is not saturated with water to minimize the risk of compaction, rutting, and erosion. Temporary logging roads may require fill material to eliminate extensive rutting and compaction. There is generally no problem in locating log landing sites in the dry seasons. Site-preparation burning and chopping are acceptable practices.

This soil is poorly suited to recreation uses such as campsites because of flooding. It is well suited to picnic areas and paths and trails. Where flood retarding structures are installed, this soil can be used for camp areas. If this soil is used for recreation developments, restricting its use during periods of high water and flooding can protect it from compaction and erosion.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads, buildings, and sanitary facilities because of flooding. Where this soil is used for roads, raising the road above the flood zone with fill material reduces this limitation. This soil is suitable for use as roadfill material.

This soil is well suited to openland and woodland wildlife habitat and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of dove and quail increase in areas cleared of all pine and hardwood trees. Prescribed burning is used to maintain and improve wildlife habitat.

The woodland ordination symbol is 1o.

13—Transylvania loam. This deep, well drained to moderately well drained, nearly level soil is in long, narrow areas on the first bottom of the Chattooga River. Individual areas are about 15 to 45 acres.

In a typical profile, the surface layer is very dark brown or very dark grayish brown loam about 31 inches thick. The subsoil is brown loam to a depth of 50 inches, and from 50 to 60 inches it is mottled grayish brown and brown silty clay loam.

Included in mapping are a few small areas of Brevard and Toccoa soils, a few small areas of soils that are more poorly drained, and a few small areas of soils that are less than 18 percent clay. Also included are a few small areas where slope is more than 3 percent. These inclusions make up less than 5 percent of the map unit.

The Transylvania soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by roots. Runoff is slow, and the potential for erosion is low. Frequently, the soil is flooded for brief periods. Depth to the seasonal high water table is 2.5 to 3.5 feet from December through April.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. The use of harvesting procedures that least disturb the soil can minimize compaction, rutting, and erosion. Woodland harvesting can be timed to summer months or to periods when the soil is not saturated with water to minimize the risk of compaction, rutting, and erosion. Temporary logging roads may require fill material to eliminate extensive rutting and compaction. There is generally no problem in locating log landing sites in the dry seasons. Site-preparation burning and chopping are acceptable methods of site preparation.

This soil is poorly suited to campsites and fairly well suited to picnic areas and to paths and trails. Flooding is the main limitation to these uses. Where flood-retarding structures are installed, this soil can be used for camp areas. If this soil is used for recreation development, restricting its use during periods of wetness and flooding can protect it from compaction and erosion.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads, buildings, and sanitary facilities because of flooding. If this soil is used for roads, raising the road above the flood zone with fill material reduces this limitation. This soil is poorly suited to use as roadfill because of its low strength.

The soil is well suited to openland and woodland wildlife habitat and poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of dove and quail can be increased in areas cleared of all pine and hardwood trees. Prescribed burning helps to maintain and improve wildlife habitat.

The woodland ordination symbol is 1o.

18F—Edneytown-Saluda association, 50 to 80 percent slopes. This association consists of very steep soils on side slopes of large mountains. Some of these soils are adjacent to medium and large streams and some are at heads of some small drainageways. The Edneytown soils are on the more uniform parts of the landscape. The Saluda soils are at heads of drainageways and along streams.

Edneytown soils make up about 60 percent of each mapped area. Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer, from 2 to 4 inches, is brown fine sandy loam. The subsoil is strong brown sandy clay loam to a depth of 29 inches, and from 29 to 36 inches it is yellowish brown sandy loam with a few yellowish mottles. The substratum from 36 to 60 inches is brown and yellowish brown loam or loamy sand with yellow mottles.

Saluda soils make up about 20 percent of each mapped area. Typically, the surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil, from 4 to 17 inches, is strong brown and yellowish brown sandy loam. The substratum from 17 to 60 inches is mottled dark brown, brown, white, black, and yellow saprolite that crushes to loamy sand.

Included in mapping are areas of rock outcrop and areas of soils that are less than 40 inches deep to bedrock. On the soil map the rock outcrops are shown by a special symbol. These inclusions make up about 20 percent of the map unit.

In the Edneytown soils the surface layer is moderately acid to very strongly acid and the subsoil and substratum are strongly acid or very strongly acid. The Saluda soils are strongly acid or very strongly acid throughout. Permeability is moderate, and the available water capacity is moderate in the Edneytown soils and low in the Saluda soils. The root zone is shallow to moderately deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is very high.

These soils are fairly well suited to woodland uses. They have the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. The very steep slope is the main limitation to woodland use. Site-preparation burning is not used on these soils because of the risk of erosion and the difficulty of controlling the fire. Acceptable methods of site preparation are the use of handtools and aerial spraying. Acceptable methods of logging on these soils are cable logging and aerial logging. Log landing sites generally must be located in adjacent less sloping areas.

These soils are very poorly suited to recreation uses, such as campsites, picnic areas, and paths and trails, because of the very steep slope. If these soils are used for campsites and picnic areas, extensive grading and revegetation are needed and the risk of erosion is very high. These soils can be used for paths and trails if the paths and trails are placed on the contour and if cutting and filling is not used. Paths and trails on this soil require extensive maintenance. Vegetation is difficult to establish in cut and filled areas.

These soils are very poorly suited to engineering uses. They are severely limited for use as a site for buildings, roads, and sanitary facilities because of the very steep slope. These soils can be used as a site for roads if extensive grading and revegetation are used, but the risk of erosion is very high. Roads and roadbanks on these soils require extensive maintenance. Vegetation is difficult to establish, especially in cut or filled areas. These soils are poorly suited to use as roadfill because of the very steep slope.

These soils are poorly suited to use as openland wildlife habitat, very poorly suited to wetland wildlife habitat, and well suited to woodland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. Prescribed burning to improve wildlife habitat is not used on these soils because of the risk of erosion and the difficulty of controlling fire.

In the Edneytown part of this association, the woodland ordination symbol is 3r, and in the Saluda part the woodland ordination symbol is 3d.

21B—Hayesville very fine sandy loam, 2 to 7 percent slopes. This deep, well drained, gently sloping soil is on narrow ridgetops. Individual areas are about 5 to 25 acres.

In a typical profile, the surface layer is brown very fine sandy loam about 3 inches thick. The subsoil is mostly red clay and clay loam to a depth of 45 inches, and from 45 to 56 inches it is red loam. The substratum from 56 to 60 inches is red fine sandy loam.

Included in mapping are a few small areas of Evard, Edneytown, Walhalla, and Brevard soils. Also included are small areas where slope is more than 7 percent. These inclusions make up less than 5 percent of the map unit.

This Hayesville soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is medium, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails, log landings, and temporary logging roads so they do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation.

This soil is well suited to recreation uses, such as campsites, picnic areas, and paths and trails.

This soil is well suited to engineering uses. It is slightly limited for most of these uses. This soil is well suited to use as roadfill.

This soil is well suited to openland and woodland wildlife habitat and is very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased in areas that are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2o.

21C—Hayesville very fine sandy loam, 7 to 15 percent slopes. This deep, well drained, sloping to strongly sloping soil is on narrow ridgetops. Individual areas are about 4 to 20 acres.

In a typical profile, the surface layer is brown very fine sandy loam about 3 inches thick. The subsoil is mostly red clay or clay loam to a depth of 45 inches, and from 45 to 56 inches it is red loam. The substratum from 56 to 60 inches is red fine sandy loam.

Included in mapping are a few small areas of Evard, Edneytown, Walhalla, and Brevard soils. Also included are small areas where slope is more than 15 percent. These inclusions make up less than 5 percent of the map unit.

This Hayesville soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails, log landings, and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing all firelines immediately after plowing also minimize erosion. Site-preparation burning, chopping, and KG blading are all acceptable methods of site preparation.

This soil is fairly well suited to campsites and picnic areas and well suited to trails and paths. Grading may be needed in some areas to reduce the slope. Placing trails on the contour can reduce erosion and maintenance.

This soil is fairly well suited to most engineering uses. Slope moderately limits this soil for use as a site for roads, buildings, and sanitary facilities. The soil is well suited to use as roadfill (fig. 9). Constructing roads on the contour with grades of less than 10 percent minimizes erosion and maintenance.

The soil is well suited to openland and woodland wildlife habitat and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning helps maintain and improve wildlife habitat.

The woodland ordination symbol is 2o.

21D—Hayesville very fine sandy loam, 15 to 25 percent slopes. This deep, well drained, moderately steep soil is on narrow ridgetops and adjacent side slopes. Individual areas are about 4 to 100 acres.

In a typical profile, the surface layer is brown very fine sandy loam about 3 inches thick. The subsoil is mostly red clay and clay loam to a depth of 45 inches, and from 45 to 56 inches it is red loam. The subsoil from 56 to 60 inches is red fine sandy loam.

Included in mapping are a few small areas of Evard, Edneytown, Walhalla, and Brevard soils. Also included are small areas where slope is more than 25 percent. These inclusions make up less than 5 percent of the map unit.

This Hayesville soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is rapid, and the potential for erosion is moderate.

This soil is well suited to woodland. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads so that they do not have a gradient of more than 10 percent and do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing firelines immediately after plowing

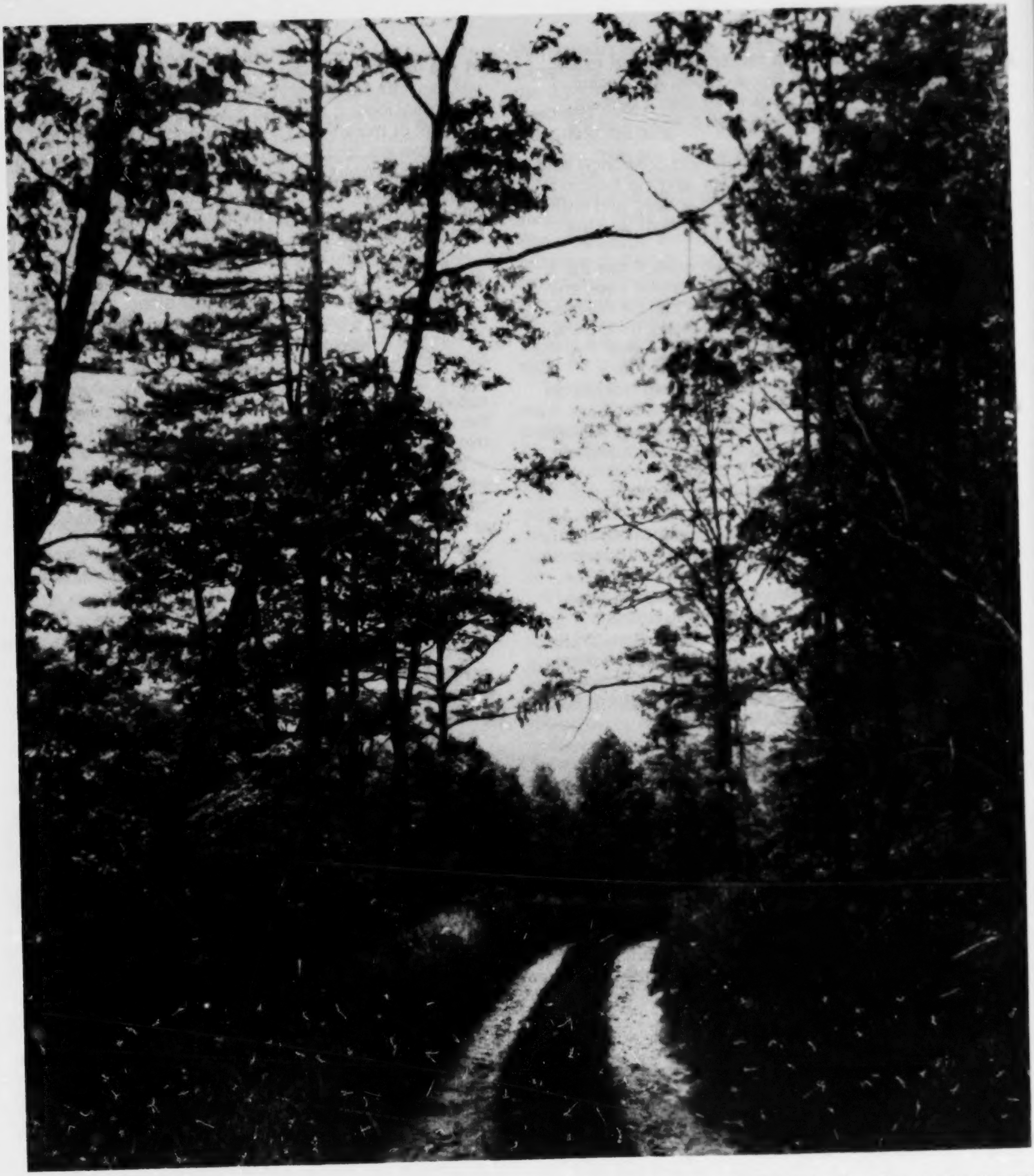


Figure 9.—This road crosses Hayesville very fine sandy loam, 7 to 15 percent slopes. Prompt application of fertilizer, lime, seed, and mulch is necessary to stabilize cuts and fills for roads.

also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation.

This soil is poorly suited to campsites and picnic areas and fairly well suited to trails and paths. Campsites and picnic areas can be established, but extensive grading is needed to reduce the slope. Revegetating cut and filled areas reduces the erosion hazard. Campsites and picnic areas are better suited to the less sloping areas. Placing trails on the contour can reduce erosion and maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for roads, small buildings, and sanitary facilities because of slope. Vegetative cover is difficult to establish on deep roadcuts. Constructing roads on the contour with grades of less than 10 percent minimizes the risk of erosion and maintenance. This soil is only fairly well suited to use as roadfill because of the moderately steep slope.

The soil is fairly well suited to openland and woodland wildlife habitat and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. The populations of quail and dove can be increased where individual areas are cleared of all pine and hardwood trees. Prescribed burning is useful in maintaining and improving wildlife habitat.

The woodland ordination symbol is 2r.

21E—Hayesville very fine sandy loam, 25 to 50 percent slopes. This deep, well drained, steep soil is on narrow ridgetops and adjacent side slopes. Individual areas are about 5 to 200 acres.

In a typical profile, the surface layer is brown very fine sandy loam about 3 inches thick. The subsoil is mostly red clay and clay loam to a depth of 45 inches, and from 45 to 56 inches it is red loam. The substratum from 56 to 60 inches is red fine sandy loam.

Included in mapping are a few small areas of Evard, Edneytown, Walhalla, and Brevard soils. Also included are small areas where slope is more than 50 percent. These inclusions make up less than 8 percent of the map unit.

This Hayesville soil is moderately acid or strongly acid throughout. Permeability is moderate, and the available water capacity is high. The root zone is deep and easily penetrated by plant roots. Runoff is very rapid, and the potential for erosion is high.

This soil is well suited to woodland uses. It has the potential for producing high-quality hardwood trees and loblolly pine of sawtimber size. Erosion can be minimized by the use of harvesting methods that least disturb the soil, such as placing skidtrails and temporary logging roads on the contour with a gradient of 10 percent or less, placing skidtrails and temporary logging roads so they do not lead to drainageways, and moving logs and plowing firelines on the contour. Waterbarring, seeding, and fertilizing firelines immediately after plowing also minimize erosion. Site-preparation burning and chopping are acceptable methods of site preparation in areas with slope up to 40 percent. Handtools are used for site preparation in areas where slope is more than 40 percent. Cable logging and aerial logging can be used in areas where slope is more than 40 percent. Log landing sites are best located on the ridgetops.

This soil is very poorly suited to such recreation uses as campsites and picnic areas and poorly suited to paths and trails. Campsites and picnic areas can be established if extensive grading is used to reduce the slope. Revegetating cut and filled areas reduces the erosion hazard. Placing paths and trails on the contour helps to reduce the risk of erosion and reduces maintenance.

This soil is poorly suited to engineering uses. It is severely limited for use as a site for small buildings, roads, and sanitary facilities because of slope. If roads are placed on the contour, there is less of an erosion hazard. Small buildings and sanitary facilities can be constructed in individual areas that are graded and cut and filled to reduce slope. Establishing vegetation in cut and filled areas reduces the erosion hazard. Vegetative cover is difficult to establish on roadcuts more than 4 feet deep. This soil is only fairly well suited to use as roadfill because of the steep slope. Constructing roads on grades of less than 10 percent minimizes the amount of maintenance.

This soil is fairly well suited to openland wildlife habitat, well suited to woodland wildlife habitat, and very poorly suited to wetland wildlife habitat. The main game species are deer, turkey, grouse, and squirrel. In all areas with slope up to 40 percent, prescribed burning can be used to improve wildlife habitat. Prescribed burning can also be used in areas where slope is more than 40 percent if the total slope length is less than 150 feet. Handtools are needed to construct firelines in areas where slope is more than 40 percent.

The woodland ordination symbol is 2r.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland is defined as the land best suited to producing food, feed, forage, fiber, and oilseed crops. When treated and managed using acceptable farming methods, it has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops. These high yields are produced with minimal expenditure of energy and economic resources, and farming this land results in the least damage to the environment.

Prime farmland may now be cropland, pasture, or woodland, or in other uses; but it is not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland soils usually have an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity of the soil is acceptable. These soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More information on the criteria for prime farmland can be obtained at the local office of the Soil Conservation Service.

About 2,000 acres, or 2.5 percent, of the Sumter National Forest Area meets the requirements for prime farmland. The prime farmland soils are scattered throughout the area, and almost all are now used as woodland.

The map units that make up prime farmland in the Sumter National Forest Area are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

Soils that have limitations—a high water table, flooding, or inadequate rainfall—may qualify for prime farmland if these limitations are overcome by such measures as drainage, flood control, or irrigation. In the following list, the measures needed to overcome these limitations, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to see if these limitations have been overcome by corrective measures.

The map units that meet the soil requirements for prime farmland are:

3B	Edneytown fine sandy loam, 2 to 7 percent slopes
9B	Walhalla fine sandy loam, 2 to 7 percent slopes
12	Toccoa fine sandy loam (where protected from flooding)
13	Transylvania loam (where protected from flooding)
21B	Hayesville very fine sandy loam, 2 to 7 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Woodland Management and Productivity

Bryant Watts, timber staff officer, Don Peterson, forest silviculturist, and Michael Sparks, timber sales, of the Forest Service, and Norman Runge, forester, of the Soil Conservation Service assisted in preparing this section.

Low available moisture capacity, low fertility, and restricted depth of root penetration are limiting factors for timber productivity. Position on slope, elevation, and aspect also influence tree growth. On long slopes, the site index is generally higher on the lower part of the slope than on the upper part of the slope. Growth is also somewhat better at higher elevations than at lower elevations and is better on northeast exposures than on southwest exposures. Other factors influencing growth and management are: the rate of seedling mortality, plant competition, limitations on the use of equipment, erosion hazard, and windthrow hazard.

Fire affects the physical, chemical, and biological properties of the soil. The degree of damage to the soil caused by fire varies with the erodibility of the soil and with the intensity and frequency of the fires. Fire removes the vegetative cover and litter, leaving the surface bare and susceptible to damage by raindrop impact. The damage done by splash from the impact increases as slope increases. Ground cover is most valuable in reducing raindrop impact, but it also retards surface flow, prevents evaporation, and modifies soil temperature.

Fire destroys organic matter that could be incorporated into the soil and thereby prevents development of good soil structure and reduces the available water capacity of the soil. Most soils of the Sumter National Forest Area have a medium available water capacity and low fertility. Maintaining organic matter content is necessary for good plant growth and vigor. In these soils with low fertility, plants depend upon organic matter for the essential elements. If the forest is burned, many of the nutrients in the organic matter become water soluble and are lost by leaching. Organisms in the soil break down the litter and aid root formation. Fire destroys soil organisms by heat and by reduction of their food sources.

Fire can be either wild or prescribed. Wild fires generally cause severe damage to soil and other resources. Three types of prescribed burning are used in the survey area: wildlife burns, rough reduction burns, and site-preparation burns. All three types of prescribed burning cause minimal resource damage when properly controlled and conducted under proper climatic conditions.

Table 5 can be used by forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *d* indicates restricted root depth; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: d and r.

In table 5, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

William Crag, recreation and inventory and evaluation staff officer, Forest Service, assisted in preparing this section.

The soils of the survey area are rated in table 6 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

Soil maps can be used to a great advantage in selecting recreation sites (fig. 10). Since most recreational areas are intensively used, however, onsite investigations are also required. The scale of soil maps is too broad to make predictions for a small site to be used as a septic tank filter field or building site.

In table 6, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 6 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 9 and interpretations for dwellings without basements and for local roads and streets in table 8.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Figure 10.—Rifle range built on Evard fine sandy loam, 15 to 25 percent slopes, and Toccoa fine sandy loam, provides a safe place for target practice.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

Oscar Stewart, wildlife biologist, Forest Service, and William J. Melven, biologist, Soil Conservation Service, assisted in preparing this section.

Soil properties, such as fertility, available water capacity, drainage, and reaction, affect the kind and amount of vegetation that is available to wildlife as food and cover. Soil properties also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. The feeding habits of wildlife differ greatly. Some species eat only insects, and others eat small animals. Some eat only plants, and some eat both plants and animals. The foliage of some plants is used for browse, while the fruit of other plants is used for food. Some plants furnish both foliage and fruits, other plants provide cover. Sites for wildlife habitat can be located by looking at the highly productive map units that will support vegetation suitable for the desired species.

Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 7, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, and soil moisture. Examples of shrubs are blackberry, American beautyberry, and dogwood.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, beaver ponds, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

Richard G. Christopher III, area engineer, Soil Conservation Service, and Jerry Marsh, engineering staff officer, and Mack Waller, zone civil engineer, Forest Service, assisted in preparing this section.

This section provides information for planning land uses related to building site development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index (*4*), soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, other small buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and other small buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for dwellings with basements and for dwellings and other small buildings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 9 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excessive gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for construction use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils; loamy soils that have a relatively high content of clay; soils that have only 20 to 40 inches of suitable material; soils that have an appreciable amount of gravel, stones, or soluble salts; or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey; have less than 20 inches of suitable material; have a large amount of gravel, stones, or soluble salts; have slopes of more than 15 percent; or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

David Rosdahl, watershed and planning staff officer, Forest Service, assisted in preparing this section.

The main objectives in watershed management are securing favorable conditions for maintaining water flows, protecting the watershed, and maintaining quality trout streams. Erosion must be minimized to achieve these objectives. Soils vary in their susceptibility to erosion. One soil may erode severely, while an adjacent soil may suffer little damage. The severity of the erosion hazard at a specific site is determined by four factors: (1) the amount, kind, and time of occurrence of precipitation; (2) the amount and kind of vegetative cover; (3) the inherent erodibility of the soil; and (4) the shape, steepness, and length of slopes. The erodibility of the soil is affected by the resistance of the surface layer to raindrop impact. Any feature, such as a clayey subsoil layer, that impedes the downward percolation of water, increases the erosion hazard.

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect terraces and diversions and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 15.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits and the engineering classifications.

Engineering Index Properties

Table 12 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 15.

The classification data give a general idea of the properties and behavior of the soils. The data can be used as a starting point in planning more detailed field investigations to determine the in-place condition of the soil at the proposed construction site.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074

millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 13 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 13, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 14 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 14 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. Only saturated zones within a depth of about 6 feet are indicated. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 14 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 14.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 15 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by South Carolina State Highway Department, Research and Materials Laboratory.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*7*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Fluvents (*Fluv*, meaning deposited by stream action, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Udifluvents (*Ud*, meaning moist, plus *fluvents*, the suborder of the Entisols that have a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Udifluvents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, nonacid, thermic Typic Udifluvents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*5*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*7*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Brevard Series

The Brevard series consists of deep, well drained, moderately permeable loamy soils that formed in colluvial material weathered from gneiss or schist rock. These sloping to steep soils are mostly on toe slopes and in coves. Slopes range from about 7 to 50 percent. These soils are classified as fine-loamy, oxidic, mesic Typic Hapludults.

The Brevard soils are geographically closely associated with Evard, Edneytown, Toccoa, and Walhalla soils. Evard soils have a solum less than 40 inches thick.

Edneytown soils have hue of 7.5YR or are yellower in the Bt horizon. The Toccoa soils have less than 18 percent clay in the particle-size control section. Walhalla soils have a Bt horizon more than 28 inches thick and a solum of less than 60 inches.

Typical pedon of Brevard fine sandy loam, 15 to 50 percent slopes, is 1.80 miles south-southwest of Stumphouse Ranger Station. From junction of Stumphouse Road and Rich Mountain Road, 1.34 miles generally south on Rich Mountain Road, then 1,300 feet at 100 degrees to Otter Creek, and then 220 feet at 70 degrees to site.

A—0 to 3 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine and medium roots; few pebbles of quartz; moderately acid; abrupt smooth boundary.

E—3 to 6 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine and medium roots; few pebbles of quartz; strongly acid; clear smooth boundary.

BE—6 to 12 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine and medium roots; few distinct clay films on faces of some peds; few small pores; strongly acid; clear smooth boundary.

Bt1—12 to 46 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fragments of schist rock; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—46 to 72 inches; red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common fragments of schist rock; few distinct clay films on faces of peds; moderately acid.

The thickness of the solum ranges from 60 inches to more than 70 inches. Depth to hard bedrock is more than 60 inches. The soil is moderately acid or strongly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is fine sandy loam or loam.

The BE horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. It is fine sandy loam or loam 4 to 10 inches thick. Some pedons do not have a BE horizon. The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown or yellow. The Bt horizon is sandy clay loam or clay loam. The BC horizon, if there is one, has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 or 8. It is sandy loam or sandy clay loam.

Edneytown Series

The Edneytown series consists of deep, well drained, moderately permeable loamy soils that formed in material weathered from gneiss, granite, or schist rock. These gently sloping to very steep soils are on ridgetops and side slopes adjacent to drainageways. Slopes range from about 2 to 80 percent. These soils are classified as fine-loamy, mixed, mesic Typic Hapludults.

Edneytown soils are geographically closely associated with Brevard, Evard, Hayesville, Saluda, and Walhalla soils. Brevard and Hayesville soils have a solum more than 40 inches thick. Evard soils have a Bt horizon with hue of 2.5YR or 5YR. Saluda soils have a solum less than 20 inches thick. Walhalla soils have a Bt horizon that is more than 28 inches in thickness and a solum that is less than 60 inches.

Typical pedon of Edneytown fine sandy loam, 50 to 80 percent slopes, is about 10.5 miles northeast of Stumphouse Ranger Station. From junction of Walhalla National Fish Hatchery Road and South Carolina Highway 107, generally north of Highway 107 for 0.65 of a mile, then east and south 0.3 mile on logging road to curve in road, then at 180 degrees for 625 feet to site.

O1—2 3/4 inches to 3/4 inch; decomposing forest litter (mostly leaves and twigs) from laurel, chestnut oak, white pine, and sourwood.

O2—3/4 inch to 0; black decomposed forest litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine and medium roots; few coarse roots; few fine flakes of mica; few small pores; very strongly acid; abrupt smooth boundary.

E—2 to 4 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; many fine and medium roots, few coarse roots; few fine flakes of mica; few small pores; very strongly acid; abrupt smooth boundary.

Bt1—4 to 15 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots, few coarse roots; few fine flakes of mica; few small fragments of quartz; distinct clay films on faces of peds; few smal pores; strongly acid; gradual wavy boundary.

Bt2—15 to 29 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots; few fine flakes of mica; common distinct clay films on faces of peds; few small pores; strongly acid; gradual wavy boundary.

BC—29 to 36 inches; yellowish brown (10YR 5/6) sand loam; few fine distinct yellow (10YR 7/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine flakes of mica; few small pores; strongly acid; gradual wavy boundary.

C1—36 to 51 inches; mottled brown (10YR 5/3) and yellowish brown (10YR 5/6) sandy loam; few fine distinct yellow (10YR 7/6) mottles; massive; very friable, nonsticky, nonplastic; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

C2—51 to 60 inches; brown (10YR 5/3) loamy sand; common medium distinct yellow (10YR 7/6) and few medium distinct pale brown (10YR 6/3) mottles; massive; very friable, nonsticky, nonplastic; few fine flakes of mica; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Depth to the Cr horizon is more than 40 inches. The A horizon is moderately acid to very strongly acid, and the B and C horizons are strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 to 4. It is fine sandy loam or loam.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 6. It is fine sandy loam or loam.

The BE horizon, if there is one, has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. It is sandy loam. The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 or 8. It is sandy clay loam. The BC horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 6 or 8. It is sandy loam or sandy clay loam. In some pedons the BC horizon is mottled in shades of white, brown, and red.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. It is sandy loam or loamy sand. In some pedons the C horizon is mottled in shades of brown, white, and red. The Cr horizon is weathered schist or granite rock that crushes to sandy loam or loamy sand.

Evard Series

The Evard series consists of deep, well drained, moderately permeable loamy soils that formed in material weathered from gneiss or schist rock. These sloping to very steep soils are on ridgetops and side slopes adjacent to drainageways. Slopes range from about 7 to 80 percent. These soils are classified as fine-loamy, oxidic, mesic Typic Hapludults.

Evard soils are geographically closely associated with Brevard, Edneytown, Hayesville, Saluda, and Walhalla soils. Brevard and Hayesville soils have a solum that is thicker than 40 inches. In addition, Hayesville soils average more than 35 percent clay in the particle-size control section. Edneytown soils have a Bt horizon with hue of 7.5YR or 10YR. Saluda soils have a solum that is less than 20 inches thick. Walhalla soils have a Bt horizon that is more than 28 inches thick and a solum that is 40 to 60 inches thick.

Typical pedon of Evard fine sandy loam, 25 to 50 percent slopes, is 3.5 miles south of Stumphouse Ranger Station and 5.2 miles southeast of Whetstone. From junction of Stumphouse Road (South Carolina Secondary Road 290) and Rich Mountain Road (USFS 744), 3.0 miles generally south on Rich Mountain Road then 425 feet at 320 degrees north from center of road.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots and few medium roots; few fine flakes of mica; strongly acid; abrupt smooth boundary.

E—2 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots and few medium roots; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

Bt1—5 to 9 inches; strong brown (7.5YR 5/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots and few medium roots; few fine flakes of mica; few distinct clay films on faces of some peds; very strongly acid; clear wavy boundary.

Bt2—9 to 29 inches; red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; common fine roots and few medium roots; few fine flakes of mica; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—29 to 37 inches; red (2.5YR 5/8) very fine sandy loam; weak medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine flakes of mica; few pebbles of quartz at top of horizon; strongly acid; gradual wavy boundary.

C1—37 to 49 inches; yellowish red (5YR 5/6) very fine sandy loam; massive; very friable, slightly sticky, slightly plastic; few fine roots; common fine flakes of mica; very strongly acid; clear smooth boundary.

C2—49 to 72 inches; reddish brown (5YR 5/4) loamy fine sand; common coarse distinct yellowish red (5YR 5/8) and few medium prominent black (5YR 2/1) mottles; massive; very friable, slightly sticky, slightly plastic; few fine roots; many fine flakes of mica; strongly acid.

The thickness of the solum ranges from 21 to 40 inches. Depth to hard bedrock is more than 48 inches and is typically more than 60 inches. The A horizon is moderately acid to very strongly acid, and the B and C horizons are strongly acid or very strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam or loam. Some pedons do not have an E horizon.

The BE horizon, if there is one, has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 or 8. It is sandy clay loam. The Bt2 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is sandy clay loam. The BC horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it is mottled in shades of red, brown, and yellow. The BC horizon is sandy loam, very fine sandy loam, clay loam, or sandy clay loam.

The C horizon has hue of 2.5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. In some pedons it is mottled in shades of brown, yellow, and black. The C horizon is loamy fine sand, very fine sandy loam, sandy loam, or loam.

Hayesville Series

The Hayesville series consists of deep, well drained, moderately permeable clayey soils that formed in material weathered from gneiss or schist rock. These gently sloping to very steep soils are on ridgetops and side slopes adjacent to drainageways. Slopes range from 2 to 50 percent. These soils are classified as clayey, oxidic, mesic Typic Hapludults.

Hayesville soils are geographically closely associated with Brevard, Edneytown, Evard, and Walhalla soils. Brevard, Edneytown, Evard, and Walhalla soils all have less than 35 percent clay in the control section of the Bt horizon.

Typical pedon of Hayesville very fine sandy loam, 7 to 15 percent slopes, is 1.4 miles southwest of Stumphouse Ranger Station. From junction of Rich Mountain Road and Stumphouse Road, 1.2 miles generally west on Stumphouse Road, then from center of road 160 feet at 280 degrees on forest trail, then 1,300 feet at 360 degrees on forest trail, then 190 feet at 20 degrees to site.

A—0 to 3 inches; brown (10YR 4/3) very fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots and few medium roots; few pebbles of quartz and schist fragments; moderately acid; abrupt smooth boundary.

BE—3 to 7 inches; red (2.5YR 5/8) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots and few medium roots; few distinct clay films on faces of some peds; moderately acid; clear wavy boundary.

Bt1—7 to 23 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; common prominent clay films on faces of most peds; strongly acid; gradual wavy boundary.

Bt2—23 to 45 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; few fine flakes of mica; common prominent clay films on faces of most peds; strongly acid; gradual wavy boundary.

BC—45 to 56 inches; red (2.5YR 5/8) loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—56 to 60 inches; red (2.5YR 5/8) fine sandy loam with black streaks between cracks of weathered schist fragments; massive; friable, nonsticky, nonplastic; few fine flakes of mica; common brown weathered schist fragments 1/2 inch to 2 inches long and 1/4 to 1 inch thick; strongly acid.

The thickness of the solum ranges from 41 to 60 inches. The depth to hard bedrock is more than 60 inches. The soil is moderately acid or strongly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is very fine sandy loam or loam.

The E horizon, if there is one, has hue of 10YR, value of 5 or 6, and chroma of 6 or 8. It is fine sandy loam.

The BE horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is sandy loam or loam. Some pedons do not have a BE horizon. The Bt horizon has hue of 2.5YR; value of 4 or 5, and chroma of 6 or 8. In some pedons it is mottled in shades of yellowish red and strong brown. The Bt horizon is clay or clay loam. The BC horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it is mottled in shades of brown and yellow. It is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it is mottled in shades of brown and yellow. The C horizon is sandy loam or loam.

Saluda Series

The Saluda series consists of shallow, well drained, moderately permeable loamy soils that formed in material weathered from granite, gneiss, or schist rock. These very steep soils are on side slopes adjacent to drainageways and at the head of drainageways. Slopes range from 50 to 80 percent. These soils are classified as loamy, mixed, mesic, shallow Typic Hapludults.

Saluda soils are geographically closely associated with Edneytown and Evard soils. Edneytown and Evard soils have a solum more than 20 inches thick.

Typical pedon of Saluda fine sandy loam, 50 to 80 percent slopes, is about 13 miles northeast of Stumphouse Ranger Station. From junction of South Carolina Highway 171 and South Carolina Highway 413, generally south on Highway 171 for 1.83 miles to logging road (at 212 degrees from Highway 171), then 1,300 feet along logging road, and then 150 feet at 170 degrees to site.

O1—2 1/2 inches to 1/2 inch; decomposing forest litter (mostly leaves and twigs) from laurel, chestnut oak, white pine, sourwood, red maple, and dogwood.

O2—1/2 inch to 0; black decomposed forest litter.

A—0 to 4 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; few fine flakes of mica; few (less than 1 percent) angular pebbles of quartz; strongly acid; abrupt smooth boundary.

Bt1—4 to 10 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; many fine and medium roots, few coarse roots; few fine flakes of mica; few (less than 1 percent) angular pebbles of quartz; strongly acid; clear wavy boundary.

Bt2—10 to 14 inches; yellowish brown (10YR 5/6) sandy loam; weak fine granular and subangular blocky structure; very friable; few fine and medium roots; few fine flakes of mica; few (less than 1 percent) angular pebbles of quartz; strongly acid; clear wavy boundary.

BC—14 to 17 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; few fine and medium roots; few fine flakes of mica; common (about 3 percent) fragments of granite rock 1/2 inch to 4 inches long and 1/4 inch to 2 inches thick; strongly acid; clear wavy boundary.

Cr1—17 to 31 inches; mottled brown (10YR 5/3) and dark brown (10YR 3/3) granite saprolite that crushes to loamy sand under light pressure; rock structure; few fine and medium roots; few fine flakes of mica; common (about 10 percent) fragments of granite rock 1/2 inch to 12 inches long and 1/4 inch to 4 inches thick; strongly acid; gradual wavy boundary.

Cr2—31 to 60 inches; mottled white (10YR 8/2), yellow (10YR 8/6), black (N 2/0), and dark brown (7.5YR 4/4) granite saprolite that crushes to loamy sand under moderate pressure; few fine and medium roots at top of horizon and few fine roots in cracks throughout the horizon; few fine flakes of mica; strongly acid.

The thickness of the solum and depth to weathered bedrock range from 10 to 20 inches. The soil is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 0 to 4. It is fine sandy loam or loam.

The E horizon, if there is one, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is fine sandy loam or loam.

The Bt and BC horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. The Bt horizon is sandy loam or sandy clay loam. The BC horizon is sandy loam.

The Cr horizon has hue of 7.5YR or 10YR, value of 3 to 8, and chroma of 2 to 8. It is saprolite of weathered granite, gneiss, or schist that crushes to loamy sand or sand.

Toccoa Series

The Toccoa series consists of deep, well drained to moderately well drained, moderately rapidly permeable soils that formed in alluvial sediments. These nearly level to gently sloping soils are on long, narrow first bottoms of the medium and large streams throughout the survey area. They are subject to occasional flooding for short periods. Slopes are less than 2 percent. These soils are classified as coarse-loamy, mixed, nonacid, thermic Typic Udifluvents.

The Toccoa soils in this survey area are taxadjuncts to the Toccoa series because they are in the sandy family rather than the coarse-loamy family and because they have gravelly and cobbly fragments at a depth of 44 inches. These differences, however, do not alter the use or behavior of the soils.

Toccoa soils are geographically closely associated with Brevard, Evard, Edneytown, and Transylvania soils. Brevard, Evard, and Edneytown soils have a Bt horizon and more than 18 percent clay in the control section. Transylvania soils have a thick, very dark grayish brown to very dark brown surface layer and more than 18 percent clay in the control section.

Typical pedon of Toccoa fine sandy loam is about 5 miles southwest of Stumphouse Ranger Station. South 4 miles on South Carolina Highway 290 from junction of South Carolina Highways 193 and 290, and southwest 0.75 mile on USFS Road 743. Site is 0.75 mile south of USFS Road 743, on Crooked Creek, 0.5 mile northeast of junction of Crooked Creek and Chauga River.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; common fine flakes of mica; slightly acid; clear wavy boundary.

A2—3 to 10 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; few fine flakes of mica; slightly acid; gradual smooth boundary.

C1—10 to 30 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; friable; few fine medium roots; few fine flakes of mica; thin lenses of loamy fine sand; slightly acid; gradual smooth boundary.

C2—30 to 54 inches; brown (10YR 4/3) fine sandy loam; massive; friable; few fine and medium roots; common fine flakes of mica; thin lenses of loamy fine sand; moderately acid; gradual smooth boundary.

C3—54 to 60 inches; brown (10YR 4/3) and pale brown (10YR 6/3) fine sandy loam; massive; friable; common fine flakes of mica; moderately acid.

The depth to bedrock is more than 60 inches. The soil is slightly acid to strongly acid throughout. Thin bedding planes of loamy and sandy textures are evident throughout the C horizon. Fine mica flakes range from few to many in all horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is fine sandy loam or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is generally mottled in shades of brown and yellow. Below a depth of 46 inches in some pedons it is mottled in chroma of 2 or less. Gravelly, cobbly, very gravelly, or very cobbly strata are below a depth of 40 inches in some pedons. The dominant texture of the C horizon is sandy loam or fine sandy loam, but thin horizons, generally less than 20 inches thick, of loamy fine sand, loamy sand, and sandy clay loam are in some pedons. Horizons that are sandy clay loam generally are below a depth of 24 inches.

Transylvania Series

The Transylvania series consists of deep, well drained to moderately well drained, moderately permeable soils that formed in alluvial sediments. These nearly level to gently sloping soils are on long, narrow first bottoms of the Chattooga River. Slopes are less than 2 percent. These soils are classified as fine-loamy, mixed, mesic Cumulic Haplumbrepts.

Transylvania soils are geographically closely associated with Brevard, Evard, and Toccoa soils. Brevard and Evard soils have a Bt horizon and do not have an umbric epipedon. Toccoa soils do not have an umbric epipedon.

Typical pedon of Transylvania loam is about 8 miles northwest of Stumphouse Ranger Station on flood plains of the Chattooga River at the Russell Place; 7.2 miles north on South Carolina Highway 28 from junction of South Carolina Highways 28 and 107 to the Russell Place, and from entrance to the Russell Place northeast on field road for 1,000 feet and then 290 feet at 331 degrees to site.

Ap—0 to 7 inches; very dark brown (10YR 2/2) loam; weak medium granular structure; very friable; few fine flakes of mica; many fine roots and few medium roots; common medium pores; moderately acid; abrupt smooth boundary.

A1—7 to 18 inches; very dark brown (10YR 2/2) loam; weak medium subangular blocky structure; very friable; few fine flakes of mica; common fine roots and few medium roots; few medium pores; moderately acid; gradual smooth boundary.

A2—18 to 31 inches; very dark grayish brown (10YR 3/2) loam; weak medium subangular blocky structure; friable; few fine flakes of mica; few fine and medium roots; few fine and medium pores; moderately acid; gradual wavy boundary.

Bw1—31 to 50 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine flakes of mica; few fine and medium roots; moderately acid; gradual wavy boundary.

Bw2—50 to 60 inches; mottled grayish brown (10YR 5/2) and brown (10YR 5/3) clay loam; weak medium subangular blocky structure; friable; few fine flakes of mica; few fine roots; moderately acid.

Depth to bedrock is more than 60 inches. The soil is moderately acid or strongly acid throughout. Mica flakes range from few to common in all horizons.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3. It is loam or fine sandy loam.

The Bw horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. In some pedons it has chroma of 2 or less below a depth of 46 inches. In some pedons the Bw horizon is mottled in shades of yellow and brown. It is loam, silty clay loam, silt loam, or clay loam. Horizons that are silty clay loam and clay loam generally are below a depth of 40 inches.

Walhalla Series

The Walhalla series consists of deep, well drained, moderately permeable loamy soils that formed in material weathered from gneiss or schist rock. These gently sloping to very steep soils are on ridgetops, coves, and side slopes adjacent to drainageways. Slopes range from 2 to 50 percent. These soils are classified as fine-loamy, oxidic, mesic Typic Hapludults.

Walhalla soils are geographically closely associated with Edneytown, Evard, and Hayesville soils. Edneytown soils have a Bt horizon with hue of 7.5YR or 10YR. Evard soils have a solum less than 40 inches thick. Hayesville soils have more than 35 percent clay in the control section of the Bt horizon.

Typical pedon of Walhalla fine sandy loam, 15 to 25 percent slopes, is 4.6 miles northwest of Stumphouse Ranger Station and 1.6 miles southwest of Whetstone; 1.6 miles southwest from junction of South Carolina Secondary Highways 193 and 196 at Whetstone on South Carolina Secondary Highway 196, then 90 feet southeast onto an unnumbered dirt road that leads to a small storage house of explosives, then 900 feet at 124 degrees on a forest trail, then 70 feet at 140 degrees to site.

A—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots and few medium roots; few pebbles of quartz; few fine flakes of mica; strongly acid; abrupt smooth boundary.

Bt1—5 to 10 inches; yellowish red (5YR 5/8) fine sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots and few medium roots; few pebbles of quartz;

few fine flakes of mica; few distinct clay films on faces of some peds; strongly acid; clear wavy boundary.

Bt2—10 to 35 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine and medium roots; few fine flakes of mica; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—35 to 46 inches; red (2.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; few fine roots; common fine flakes of mica; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—46 to 53 inches; red (2.5YR 5/8) fine sandy loam; few fine distinct reddish yellow (5YR 6/8) mottles; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; few fine roots; common fine flakes of mica; strongly acid; clear wavy boundary.

C—53 to 65 inches; yellowish red (5YR 5/8) loamy sand; common medium distinct reddish yellow (5YR 6/8) mottles; massive; very friable, nonsticky, nonplastic; few fine roots; common fine flakes of mica; few fragments of dark brown weathered gneiss or schist; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Depth to hard bedrock is more than 60 inches The A horizon is moderately acid to strongly acid, and the B and C horizons are strongly acid or very strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The E horizon, if there is one, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. It is fine sandy loam or loam.

The BE horizon, if there is one, has hue of 5YR, 7.5YR, or 10YR; value of 4 or 5; and chroma of 4 to 8. It is sandy clay loam or sandy loam. The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is clay loam or sandy clay loam. The BC horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 6 or 8. In some pedons it is mottled in shades of brown and yellow. The BC horizon is sandy loam, loam, and sandy clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 5 or 6, and chroma of 6 or 8. In some pedons it is mottled in shades of brown or yellow. The C horizon is sandy loam or loam.

Formation of the Soils

The factors of soil formation and the processes of soil horizon differentiation are described in this section.

Factors of Soil Formation

Soil is the natural medium for the growth of plants. It is the product of soil-forming processes acting on accumulated or deposited geologic materials. The five important factors in soil formation are parent material, climate, living organisms (plants and animals), relief, and time.

Climate and living organisms are the active forces of soil formation. Their effect on the parent material is modified by relief and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. In some places, one factor dominates in the formation and determines most of the properties of the soil formed, but generally the interaction of all five factors determines the kind of soil that is formed.

Although soil formation is complex, some understanding of the soil-forming processes may be gained by considering each of the five factors separately. Each of the five factors, however, is affected by and affects each of the other factors.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed (*5*). It influences the mineral and chemical composition of the soils. In the Sumter National Forest Area of Oconee County, the parent material was derived from three sources: residuum from the parent rocks, alluvium, and colluvium.

Residual parent material is formed in place through the weathering of the underlying rock. Soils that formed in this material make up about 98 percent of the survey area. For the most part, the rocks of the survey area are biotite schist and gneiss, hornblende schist and gneiss, granite, muscovite pegmatite, and quartzite (*3*). The Edneytown, Evard, Walhalla, Hayesville, and Saluda soils formed in residual parent material.

In the area, alluvial deposits consist of a mixture of gravel, sand, silt, and clay. Much of this alluvium weathered from rocks in the uplands nearby, but some weathered from rocks farther north. The soils that formed in alluvium are on the bottom lands. Soils on bottoms are weakly developed and still receive deposits during floods. The Toccoa and Transylvania soils formed in alluvial deposits.

Colluvial deposits are made up of sand, silt, clay, and rock fragments detached from residual parent material at higher positions and carried down the slopes, mostly by gravity. Frost action also influenced the development of such deposits. The Brevard soils formed in colluvial deposits.

Climate

The survey area has a temperate climate, and rainfall is well distributed throughout the year. Temperature and precipitation are discussed in the section on climate.

Climate, particularly precipitation and temperature, affects the physical, chemical, and biological relationships in the soil. Water dissolves minerals, aids chemical and biological activity, and transports the dissolved mineral and organic material through the soil profile. Large amounts of water percolating through the soil promote leaching of the soluble bases and the translocation of the less soluble and colloidal material downward through the soil profile.

The amount of water that percolates through the soil depends on the amount of rainfall, the relative humidity, and the length of the frost-free season. Percolation also is affected by relief, or lay of the land, and by permeability of the soil material. Weathering of the parent material is intensified if percolation is interrupted only by brief periods of shallow freezing. A high average temperature speeds weathering. A high average temperature also increases the number and kinds of living organisms in the soil; and the organisms, in turn, affect soil formation.

Living Organisms

The number and kinds of plants and animals that live in and on the soil are determined mainly by the climate. To a lesser extent, they are determined by the parent material, relief, and age of the soil.

Bacteria, fungi, and other micro-organisms are indispensable in soil formation. They hasten the weathering of minerals and the decomposition of organic matter. Larger plants alter the soil microclimate, furnish organic matter, and transfer chemical elements from the subsoil to the surface soil.

Most of the fungi, bacteria, and other micro-organisms in the soils of the survey area are in the upper few inches of the soil. Earthworms and other small invertebrates are active chiefly in the A horizon and upper part of the B horizon, where they slowly but continuously mix the soil material. Bacteria and fungi decompose organic matter and release nutrients for plant use. Other animals play a secondary role in soil formation. By eating plants, they perform one step in returning plant material to the soil.

In the survey area, the native vegetation in the uplands was chiefly Virginia pine, shortleaf pine, oaks, sourwood, and hickory. On the bottom land, it was mainly sweetgum, yellow-poplar, maple, tupelo, and ash. Large trees affect soil formation by bringing nutrients up from deep in the soil, by bringing soil material up from varying depths when the trees blow over, and by providing large openings that are filled by material from above as large roots decay.

Relief

Relief, or lay of the land, influences soil formation through its effect on moisture, temperature, and erosion. In the survey area, slopes range from 0 to about 80 percent. Most soils on uplands with slope of less than 15 percent have thick, well-developed profiles. Soils with slope of 15 to 80 percent generally have thinner and less developed profiles. In the survey area the most extensive soils are steep to very steep and do not have strongly developed horizons.

Time

The soils in the survey area range from immature, or young, to mature. The young soils have very little profile development, and the mature soils have well-defined horizons.

On the smoother parts of the uplands, the soils have generally developed to maturity. Examples of these mature soils are the Hayesville soils. On the stronger slopes, geologic erosion has removed some soil material. Consequently, these more sloping soils are shallower than are less sloping soils. Examples are the Evard and Saluda soils. On the first bottoms of streams, the soils are young because the material has not been in place long enough for soil horizons to form. The Toccoa soil is an example of a young soil.

Processes of Soil Horizon Differentiation

The differentiation of horizons is the result of many processes. These include the accumulation of organic matter, the leaching of soluble salts, the reduction and translocation of iron, the formation of soil structure, the physical weathering, caused by freezing and thawing, and the chemical weathering of primary minerals or rocks.

Some of these processes are continually taking place in all soils, but the number of active processes and the rate at which the processes occur vary from one soil to another.

Most soils have three major horizons called A, B, and C (*7*). These major horizons may be further subdivided by the use of subscripts and letters to indicate changes within one horizon. An example is the Bt horizon, which is a layer within the B horizon that has translocated clay eluviated from the A horizon.

The A horizon is the surface layer. It is the layer with the largest accumulation of organic matter. If the soil has been cleared and plowed, the surface layer is called an Ap horizon. The A horizon is also the layer of maximum leaching, or eluviation, of clay and iron. When considerable leaching has taken place, an E horizon is formed just below the surface layer. Generally the E horizon is the lightest colored horizon in the soil. Edneytown soils, for example, have a strongly developed E horizon.

The B horizon is beneath the A and E horizons and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the E horizon. Evard, Edneytown, and Hayesville soils are among the soils that have a well-expressed B horizon.

The C horizon is below the A or B horizons. Some soils, such as Toccoa, have not formed a B horizon, and the C horizon is immediately below the A horizon. The C horizon consists of materials that are little altered by the soil-forming processes but may have been modified by weathering.

Well drained soils have a yellowish brown or reddish subsoil. These colors are the result of a thin coating of iron oxide on the sand, silt, and clay particles. A soil is considered well drained if it is free of gray (chroma of 2 or less) mottles to a depth of at least 30 inches. Most soils in the survey area are well drained.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aerial logging. A logging system that makes use of aircraft or balloons.

Aerial spraying. Application of a spray, usually a herbicide, by use of aircraft.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Bench. Shelves constructed at vertical and lateral intervals across a slope, either on or near the contour.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cable logging. A logging system that brings trees from the stump to the landing by using cables.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Chopping (drum chopping). Site preparation for planting or seeding by using a rolling drum chopper, which crushes unmerchantable trees and other debris to the ground and chops or partially chops them.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

Fireline. A natural or constructed barrier that controls the spread of fire.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Grading. Shaping and smoothing the surface of earthworks.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

KG blading. Preparation of a site for tree planting or seeding using a KG shearing blade mounted on a crawler tractor. The blade shears unmerchantable stems and tree stumps above ground level.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Log landing. An area cleared and used for the purpose of assembling logs for loading. Logs or trees are skidded to log landings.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three-dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Prescribed burning. Intentional application of fire to wildland fuels in either their natural or modified state, under such conditions of weather, fuel moisture, soil moisture, etc., as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives of silviculture, wildlife management, grazing, fire-hazard reduction, etc. It seeks to employ fire scientifically so as to realize maximum net benefits with minimum damage and at acceptable cost.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sawtimber. Trees of sufficient size and quality to yield logs for sawing into boards. This generally includes trees larger than 9.0 inches DBH for softwoods and 12.0 inches DBH for hardwoods.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Site preparation. The process by which areas are prepared for planting, seeding, or natural regeneration.

Site-preparation burning. Preparation of a site for tree planting or seeding by use of prescribed burning.

Skidtrails. Trails resulting from the tearing up of the forest floor during the process of skidding logs.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Temporary logging roads. Logging roads that are constructed or cleared, are intended for use one time, and then are abandoned, obliterated, or restored to timber production.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Tractor skidders. Crawler-type tractors used for skidding.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Clayton, Georgia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	51.4	28.2	39.8	70	3	37	6.60	4.07	8.87	9	1.5
February---	54.7	29.5	42.1	73	7	28	6.44	3.54	8.99	9	1.6
March------	61.7	35.5	48.6	81	15	95	7.80	4.93	10.38	10	1.9
April------	71.6	43.1	57.4	87	25	231	5.79	2.98	8.25	8	.0
May--------	77.3	51.1	64.2	90	33	440	6.35	3.04	9.20	9	.0
June-------	82.7	58.3	70.5	94	43	615	5.55	3.43	7.46	9	.0
July-------	85.2	62.0	73.6	94	51	732	5.71	3.19	7.93	10	.0
August-----	84.7	61.5	73.1	92	50	716	5.90	2.84	8.54	9	.0
September--	79.7	55.9	67.8	91	39	534	5.43	2.61	7.86	7	.0
October----	72.0	44.2	58.1	85	24	260	4.83	1.43	7.57	6	.0
November---	62.2	35.3	48.8	78	14	69	5.37	3.29	7.23	7	.1
December---	53.5	29.7	41.6	72	7	26	6.88	3.68	9.69	9	.9
Year-------	69.7	44.5	57.1	96	0	3,783	72.65	62.39	82.52	102	6.0

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Clayton, Georgia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 13	April 24	May 9
2 years in 10 later than--	April 5	April 18	May 3
5 years in 10 later than--	March 21	April 8	April 21
First freezing temperature in fall:			
1 year in 10 earlier than--	October 25	October 13	October 7
2 years in 10 earlier than--	October 31	October 19	October 12
5 years in 10 earlier than--	November 10	October 30	October 22

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Clayton, Georgia]

Probability	Length of growing season if daily minimum temperature is ---		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	209	182	160
8 years in 10	217	189	168
5 years in 10	233	204	183
2 years in 10	250	218	198
1 year in 10	258	226	205

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
3B	Edneytown fine sandy loam, 2 to 7 percent slopes	52	*
3C	Edneytown fine sandy loam, 7 to 15 percent slopes	274	0.4
3D	Edneytown fine sandy loam, 15 to 25 percent slopes	496	0.7
3E	Edneytown fine sandy loam, 25 to 50 percent slopes	1,698	2.3
3F	Edneytown fine sandy loam, 50 to 80 percent slopes	3,797	5.1
6C	Evard fine sandy loam, 7 to 15 percent slopes	1,674	2.2
6D	Evard fine sandy loam, 15 to 25 percent slopes	8,916	11.9
6E	Evard fine sandy loam, 25 to 50 percent slopes	29,791	39.7
6F	Evard fine sandy loam, 50 to 80 percent slopes	14,260	19.0
7C	Brevard fine sandy loam, 7 to 15 percent slopes	1,309	1.8
7E	Brevard fine sandy loam, 15 to 50 percent slopes	721	1.0
9B	Walhalla fine sandy loam, 2 to 7 percent slopes	44	*
9C	Walhalla fine sandy loam, 7 to 15 percent slopes	1,097	1.5
9D	Walhalla fine sandy loam, 15 to 25 percent slopes	2,255	3.0
9E	Walhalla fine sandy loam, 25 to 50 percent slopes	760	1.0
12	Toccoa fine sandy loam	1,703	2.3
13	Transylvania loam	58	*
18F	Edneytown-Saluda association, 50 to 80 percent slopes	984	1.3
21B	Hayesville very fine sandy loam, 2 to 7 percent slopes	144	0.2
21C	Hayesville very fine sandy loam, 7 to 15 percent slopes	1,736	2.3
21D	Hayesville very fine sandy loam, 15 to 25 percent slopes	2,675	3.6
21E	Hayesville very fine sandy loam, 25 to 50 percent slopes	155	0.2
	Water	401	0.5
	Total	75,000	100.0

*Less than 0.1 percent.

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
3B, 3C Edneytown	2o	Slight	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, shortleaf pine, eastern white pine, yellow-poplar.
						Pitch pine	70	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern white pine	80	
						Yellow-poplar	90	
						White oak	60	
						Southern red oak	60	
						Hickory	58	
3D, 3E Edneytown	2r	Moderate	Moderate	Moderate	Slight	Loblolly pine	80	Loblolly pine, shortleaf pine, eastern white pine, yellow-poplar.
						Pitch pine	70	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern white pine	80	
						Yellow-poplar	90	
						White oak	60	
						Southern red oak	60	
						Hickory	58	
3F Edneytown	3r	Severe	Severe	Severe	Slight	Loblolly pine	80	Loblolly pine, shortleaf pine, eastern white pine, yellow-poplar.
						Pitch pine	70	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern white pine	80	
						Yellow-poplar	90	
						White oak	60	
						Southern red oak	60	
						Hickory	58	
6C Evard	2o	Slight	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, shortleaf pine.
						Pitch pine	70	
6D, 6E Evard	2r	Moderate	Moderate	Moderate	Slight	Shortleaf pine	70	Eastern white pine, yellow-poplar, loblolly pine, shortleaf pine.
						Virginia pine	70	
						Eastern white pine	80	
						Yellow-poplar	90	
6F Evard	3r	Severe	Severe	Severe	Slight	White oak	60	Eastern white pine, loblolly pine, shortleaf pine.
						Southern red oak	60	
						Shortleaf pine	65	
						Virginia pine	60	
7C Brevard	2o	Slight	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine, Fraser fir, northern red oak, yellow-poplar, Scotch pine, shortleaf pine, eastern white pine, Norway spruce, black walnut.
						Virginia pine	80	
						Eastern white pine	90	
						Northern red oak	75	
						Yellow-poplar	95	
						Hemlock	---	
						White oak	---	
						Red maple	---	
7E Brevard	2r	Slight	Moderate	Moderate	Slight	Shortleaf pine	70	Loblolly pine, Fraser fir, northern red oak, yellow-poplar, Scotch pine, shortleaf pine, eastern white pine, Norway spruce, black walnut.
						Virginia pine	80	
						Eastern white pine	90	
						Northern red oak	75	
						Yellow-poplar	95	
						Hemlock	---	
						White oak	---	
						Red maple	---	

TABLE 5.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
9B, 9C Walhalla	2o	Slight	Slight	Slight	Slight	Shortleaf pine	70	Eastern white pine, loblolly pine, Virginia pine, shortleaf pine, northern red oak, white oak, yellow-poplar.
						Virginia pine	70	
						Eastern white pine	80	
						Northern red oak	75	
						Yellow-poplar	90	
						Hemlock	---	
						White oak	---	
						Red maple	---	
9D, 9E Walhalla	2r	Moderate	Moderate	Moderate	Slight	Shortleaf pine	70	Eastern white pine, loblolly pine, Virginia pine, shortleaf pine, northern red oak, white oak, yellow-poplar.
						Virginia pine	70	
						Eastern white pine	80	
						Northern red oak	75	
						Yellow-poplar	90	
						Hemlock	---	
						White oak	---	
						Red maple	---	
12 Toccoa	1o	Slight	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
						Yellow-poplar	107	
						Sweetgum	100	
						Southern red oak	---	
13 Transylvania	1o	Slight	Slight	Slight	Slight	Eastern white pine	90	Eastern white pine, yellow-poplar, northern red oak, American sycamore, black walnut, white ash, Scotch pine.
						Black walnut	---	
						Northern red oak	80	
						Yellow-poplar	100	
						American sycamore	---	
18F*:								
Edneytown	3r	Severe	Severe	Severe	Slight	Loblolly pine	80	Loblolly pine, shortleaf pine, eastern white pine, yellow-poplar.
						Pitch pine	70	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern white pine	80	
						Yellow-poplar	90	
						White oak	60	
						Southern red oak	60	
						Hickory	58	
Saluda	3d	Severe	Severe	Moderate	Moderate	Shortleaf pine	57	Loblolly pine, Virginia pine, eastern white pine.
						Eastern white pine	88	
						Pitch pine	68	
						Virginia pine	70	
						Yellow-poplar	85	
21B, 21C Hayesville	2o	Slight	Slight	Slight	Slight	Pitch pine	81	Fraser fir, Scotch pine, shortleaf pine, eastern white pine, Norway spruce, loblolly pine.
						Shortleaf pine	66	
						Virginia pine	70	
						Eastern white pine	86	
						Northern red oak	70	
						Yellow-poplar	93	
21D, 21E Hayesville	2r	Slight	Slight	Slight	Slight	Pitch pine	81	Fraser fir, Scotch pine, shortleaf pine, eastern white pine, Norway spruce, loblolly pine.
						Shortleaf pine	66	
						Virginia pine	70	
						Eastern white pine	86	
						Northern red oak	70	
						Yellow-poplar	93	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
3B Edneytown	Slight	Slight	Moderate: slope.	Slight.
3C Edneytown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
3D Edneytown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
3E, 3F Edneytown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
6C Evard	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
6D Evard	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
6E, 6F Evard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
7C Brevard	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
7E Brevard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
9B Walhalla	Slight	Slight	Moderate: slope.	Slight.
9C Walhalla	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
9D Walhalla	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
9E Walhalla	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
12 Toccoa	Severe: flooding.	Slight	Moderate: flooding.	Slight.
13 Transylvania	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
18F*:				
Edneytown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Saluda	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
21B Hayesville	Slight	Slight	Moderate: slope.	Slight.
21C Hayesville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
21D, 21E Hayesville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements								Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
3B, 3C------------- Edneytown	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
3D----------------- Edneytown	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
3E, 3F------------- Edneytown	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
6C----------------- Evard	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
6D----------------- Evard	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
6E, 6F------------- Evard	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
7C----------------- Brevard	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
7E----------------- Brevard	Very poor.	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
9B----------------- Walhalla	Good	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
9C----------------- Walhalla	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
9D----------------- Walhalla	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
9E----------------- Walhalla	Very poor.	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
12----------------- Toccoa	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
13----------------- Transylvania	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
18F*:											
Edneytown---------	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
Saluda------------	Very poor.	Very poor.	Poor	Fair	Fair	---	Very poor.	Very poor.	Very poor.	Fair	Very poor.
21B---------------- Hayesville	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
21C---------------- Hayesville	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
21D, 21E----------- Hayesville	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small buildings	Local roads and streets	Lawns and landscaping
3B Edneytown	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Slight.
3C Edneytown	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
3D, 3E, 3F Edneytown	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
6C Evard	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
6D, 6E, 6F Evard	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
7C Brevard	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
7E Brevard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
9B Walhalla	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
9C Walhalla	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
9D, 9E Walhalla	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
12 Toccoa	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
13 Transylvania	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
18F*:						
Edneytown	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Saluda	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.
21B Hayesville	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
21C Hayesville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
21D, 21E Hayesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3B Edneytown	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
3C Edneytown	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too sandy, slope.
3D, 3E, 3F Edneytown	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
6C Evard	Moderate: slope.	Severe: slope.	Moderate: slope, too sandy.	Moderate: slope.	Fair: too sandy, small stones, slope.
6D, 6E, 6F Evard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
7C Brevard	Moderate: slope.	Severe: slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, slope.
7E Brevard	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
9B Walhalla	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
9C Walhalla	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, slope.
9D, 9E Walhalla	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
12 Toccoa	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Good.
13 Transylvania	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
18F*:					
Edneytown	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
Saluda	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
21B Hayesville	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: seepage, too clayey.	Slight	Poor: too clayey, hard to pack.
21C Hayesville	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 9.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21D, 21E------------ Hayesville	Severe: slope.	Severe: slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
3B Edneytown	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
3C Edneytown	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
3D Edneytown	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
3E, 3F Edneytown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
6C Evard	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
6D Evard	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
6E, 6F Evard	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
7C Brevard	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
7E Brevard	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
9B Walhalla	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
9C Walhalla	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
9D Walhalla	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
9E Walhalla	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
12 Toccoa	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
13 Transylvania	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
18F*: Edneytown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Saluda	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
21B, 21C Hayesville	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
21D, 21E---------------- Hayesville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--			Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Terraces and diversions	Grassed waterways
3B Edneytown	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Too sandy	Favorable.
3C, 3D, 3E, 3F Edneytown	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Slope, too sandy.	Slope.
6C, 6D, 6E, 6F Evard	Severe: slope.	Severe: seepage, slope.	Severe: no water.	Slope, too sandy.	Slope.
7C Brevard	Moderate: seepage.	Severe: piping.	Severe: no water.	Slope	Slope.
7E Brevard	Severe: slope.	Severe: piping.	Severe: no water.	Slope	Slope.
9B Walhalla	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Favorable	Favorable.
9C, 9D, 9E Walhalla	Severe: slope.	Severe: piping.	Severe: no water.	Slope	Slope.
12 Toccoa	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Favorable	Favorable.
13 Transylvania	Moderate: seepage.	Severe: hard to pack.	Moderate: deep to water, slow refill.	Wetness	Favorable.
18F*:					
Edneytown	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Slope, too sandy.	Slope.
Saluda	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Slope, depth to rock.	Slope, depth to rock.
21B Hayesville	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Favorable	Favorable.
21C Hayesville	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Slope	Slope.
21D, 21E Hayesville	Severe: slope.	Severe: hard to pack.	Severe: no water.	Slope	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
3B, 3C, 3D, 3E, 3F Edneytown	0-4	Loamy fine sand	SM, SM-SC	A-2, A-4	0-2	95-100	90-100	60-70	30-40	<25	NP-7
	4-36	Sandy clay loam, clay loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	0	98-100	95-100	80-97	45-75	25-35	5-15
	36-60	Loamy sand, sandy loam.	SM, SM-SC	A-2, A-4	0	98-100	95-100	50-70	15-40	<25	NP-7
6C, 6D, 6E, 6F Evard	0-5	Fine sandy loam	SM, SM-SC	A-2, A-4	0-5	80-100	75-100	65-90	20-50	<28	NP-7
	5-49	Sandy clay loam, clay loam, fine sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6, A-7-6	0-2	90-100	85-100	60-95	30-70	25-45	7-18
	49-72	Sandy loam, loam, loamy sand.	SM, ML	A-2, A-4	0-15	75-100	70-100	60-90	15-50	---	NP
7C, 7E Brevard	0-6	Fine sandy loam	ML, CL, CL-ML	A-4	5-15	95-100	95-100	85-95	50-80	<30	NP-10
	6-72	Sandy clay loam, clay loam, silty clay loam.	CL, CL-ML, ML, MH	A-4, A-6	5-15	95-100	95-100	85-97	51-75	25-55	5-20
9B, 9C, 9D, 9E Walhalla	0-5	Fine sandy loam	SM	A-2, A-4	0	70-100	65-100	65-95	20-50	<25	NP-7
	5-46	Sandy clay loam, clay loam, fine sandy loam.	MH, SC, CL, CL-ML	A-4, A-6, A-7	0	98-100	90-100	80-97	30-70	25-55	5-25
	46-65	Loamy sand, sandy loam, loam.	SM, SM-SC	A-2, A-4	0	80-100	75-100	70-95	15-50	<25	NP-7
12 Toccoa	0-10	Fine sandy loam	SM, ML	A-2, A-4	0	98-100	95-100	85-100	20-60	<30	NP-4
	10-60	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
13 Transylvania	0-31	Loam	ML, MH	A-4, A-6	0	100	90-100	80-100	60-95	30-55	7-20
	31-60	Silty clay loam, clay loam, loam.	ML, MH	A-4, A-6, A-7	0	100	90-100	85-100	60-95	30-55	7-20
18F*:											
Edneytown	0-4	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0-2	95-100	90-100	70-85	40-70	<25	NP-7
	4-36	Sandy clay loam, clay loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	0	98-100	95-100	80-97	45-75	25-35	5-15
	36-60	Loamy sand, sandy loam.	SM, SM-SC	A-2, A-4	0	98-100	95-100	50-70	15-40	<25	NP-7
Saluda	0-4	Fine sandy loam	SM, SM-SC	A-2, A-4	0-3	90-100	85-98	60-70	25-45	<30	NP-7
	4-17	Sandy loam, sandy clay loam, clay loam.	SM, SM-SC, SC	A-2, A-4, A-6	0-2	90-100	85-98	60-85	30-50	20-38	3-15
	17-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
21B, 21C, 21D, 21E Hayesville	0-3	Fine sandy loam	SM, SC, ML, CL	A-4	0	90-100	85-95	70-95	35-60	<25	NP-10
	3-45	Clay loam, clay	ML, MH, CL, CH	A-6, A-7	0	90-100	85-100	70-100	55-75	36-55	11-25
	45-56	Sandy clay loam, clay loam.	SM, ML, MH, CL	A-6, A-7	0-5	90-100	90-100	85-95	45-65	36-55	11-25
	56-60	Fine sandy loam, loam.	SM, ML, CL, SC	A-4, A-6	5-15	90-100	90-95	65-90	40-55	<28	NP-12

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
3B, 3C, 3D, 3E, 3F--------------- Edneytown	0-4	5-15	1.40-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low--------	0.17	3	1-3
	4-36	20-35	1.30-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low--------	0.24		
	36-60	4-15	1.30-1.50	2.0-6.0	0.06-0.12	4.5-5.5	Low--------	0.17		
6C, 6D, 6E, 6F--- Evard	0-5	5-20	1.30-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low--------	0.24	5	<2
	5-49	18-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.24		
	49-72	5-20	1.20-1.40	0.6-2.0	0.08-0.12	4.5-6.0	Low--------	0.24		
7C, 7E------------ Brevard	0-6	10-25	1.30-1.50	2.0-6.0	0.16-0.24	5.1-6.0	Low--------	0.17	5	1-3
	6-72	20-35	1.30-1.40	0.6-2.0	0.15-0.20	5.1-6.0	Low--------	0.24		
9B, 9C, 9D, 9E--- Walhalla	0-5	10-25	1.30-1.40	2.0-6.0	0.11-0.20	5.1-6.0	Low--------	0.20	5	---
	5-46	18-35	1.30-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low--------	0.24		
	46-65	8-25	1.30-1.50	2.0-6.0	0.06-0.14	4.5-5.5	Low--------	0.17		
12--------------- Toccoa	0-10	3-17	1.35-1.45	2.0-6.0	0.09-0.12	5.1-6.5	Low--------	0.24	5	1-2
	10-60	2-19	1.40-1.50	2.0-6.0	0.09-0.12	5.1-6.5	Low--------	0.10		
13--------------- Transylvania	0-31	5-25	1.30-1.50	0.6-2.0	0.16-0.24	4.5-6.0	Low--------	0.37	5	2-5
	31-60	10-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low--------	0.32		
18F*:										
Edneytown--------	0-4	5-15	1.40-1.60	2.0-6.0	0.11-0.17	4.5-6.0	Low--------	0.20	3	1-3
	4-36	20-35	1.30-1.40	0.6-2.0	0.12-0.18	4.5-5.5	Low--------	0.24		
	36-60	4-15	1.30-1.50	2.0-6.0	0.06-0.12	4.5-5.5	Low--------	0.17		
Saluda-----------	0-4	5-20	1.30-1.60	2.0-6.0	0.10-0.14	4.5-5.5	Low--------	0.20	2	.5-2
	4-17	18-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low--------	0.20		
	17-60	---	---	---	---	---	---	---		
21B, 21C, 21D, 21E-------------- Hayesville	0-3	10-25	1.35-1.60	2.0-6.0	0.12-0.20	4.5-5.5	Low--------	0.20	5	1-3
	3-45	30-50	1.20-1.35	0.6-2.0	0.15-0.20	4.5-5.5	Low--------	0.24		
	45-56	20-40	1.30-1.40	0.6-2.0	0.12-0.20	4.5-5.5	Low--------	0.20		
	56-60	5-15	1.45-1.65	2.0-6.0	0.11-0.15	4.5-5.5	Low--------	0.17		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
3B, 3C, 3D, 3E, 3F---------------- Edneytown	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
6C, 6D, 6E, 6F---- Evard	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
7C, 7E------------ Brevard	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
9B, 9C------------ Walhalla	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
9D---------------- Walhalla	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
9E---------------- Walhalla	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
12---------------- Toccoa	B	Occasional	Brief-----	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	Low------	Moderate.
13---------------- Transylvania	B	Frequent----	Brief-----	Jan-Dec	2.5-3.5	Apparent	Dec-Apr	>60	---	High-----	High.
18F*:											
Edneytown---------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Saluda------------	C	None---------	---	---	>6.0	---	---	10-20	Soft	Moderate	High.
21B, 21C, 21D, 21E-------------- Hayesville	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.

---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX TEST DATA

[Samples tested by the South Carolina State Highway Department, Research and Materials Laboratory]

Soil name, sample number, horizon, and depth in inches	Mechanical analysis: Percentage passing sieve: No. 10	Mechanical analysis: Percentage passing sieve: No. 60	Mechanical analysis: Percentage passing sieve: No. 200	Mechanical analysis: Percentage smaller than 0.005 mm	Liquid limit	Plasticity index	Classification: AASHTO*	Classification: Unified
					Pct			
Brevard fine sandy loam:** (S79SC-073-005)								
A----------------0 to 3	95	77	52	25	--	NP	A-4(00)	ML
Bt2-------------12 to 46	98	90	75	51	51	20	A-7-5(16)	MH
Bt3-------------46 to 72	96	85	67	37	39	12	A-6(07)	ML
Evard fine sandy loam:*** (S79SC-073-002)								
E---------------2 to 5	94	77	43	22	--	NP	A-4(00)	SM
Bt2-------------9 to 29	98	85	63	32	38	10	A-4(05)	ML
C2-------------49 to 72	100	84	50	7	--	NP	A-4(00)	ML
Toccoa fine sandy loam:**** (S80SC-073-001)								
A---------------0 to 5	99	77	30	15	--	NP	A-2-4(00)	SM
C1--------------5 to 29	99	61	22	12	--	NP	A-2-4(00)	SM
C4-------------44 to 60	31	14	5	2	--	NP	A-1-a(00)	GP
Walhalla fine sandy loam:*** (S79SC-073-004)								
A---------------0 to 5	73	55	28	18	--	NP	A-2-4(00)	SM
Bt2------------10 to 35	100	85	65	50	53	15	A-7-5(11)	MH
C--------------53 to 65	96	60	25	11	--	NP	A-2-4(00)	SM

*Group index based on AASHTO M-145-66.

**Typical pedon for the series.

***Typical pedon for the series and the type location for the official series.

****Sample site is about 8 miles north of Stumphouse Ranger Station; from junction of South Carolina Highway 107 and Forest Service Road 710 go 3.19 miles on Forest Service Road 710, then 34 feet at 38 degrees north to site. Taxadjunct to the series because the soil is in the sandy family and has gravelly or cobbly strata at a depth of 44 inches.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Brevard--------------------	Fine-loamy, oxidic, mesic Typic Hapludults
Edneytown------------------	Fine-loamy, mixed, mesic Typic Hapludults
Evard----------------------	Fine-loamy, oxidic, mesic Typic Hapludults
Hayesville-----------------	Clayey, oxidic, mesic Typic Hapludults
Saluda---------------------	Loamy, mixed, mesic, shallow Typic Hapludults
Toccoa*--------------------	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Transylvania---------------	Fine-loamy, mixed, mesic Cumulic Haplumbrepts
Walhalla-------------------	Fine-loamy, oxidic, mesic Typic Hapludults

* The soil is a taxadjunct to the series. See text for description of those characteristics of the soil that are outside the range of the series.

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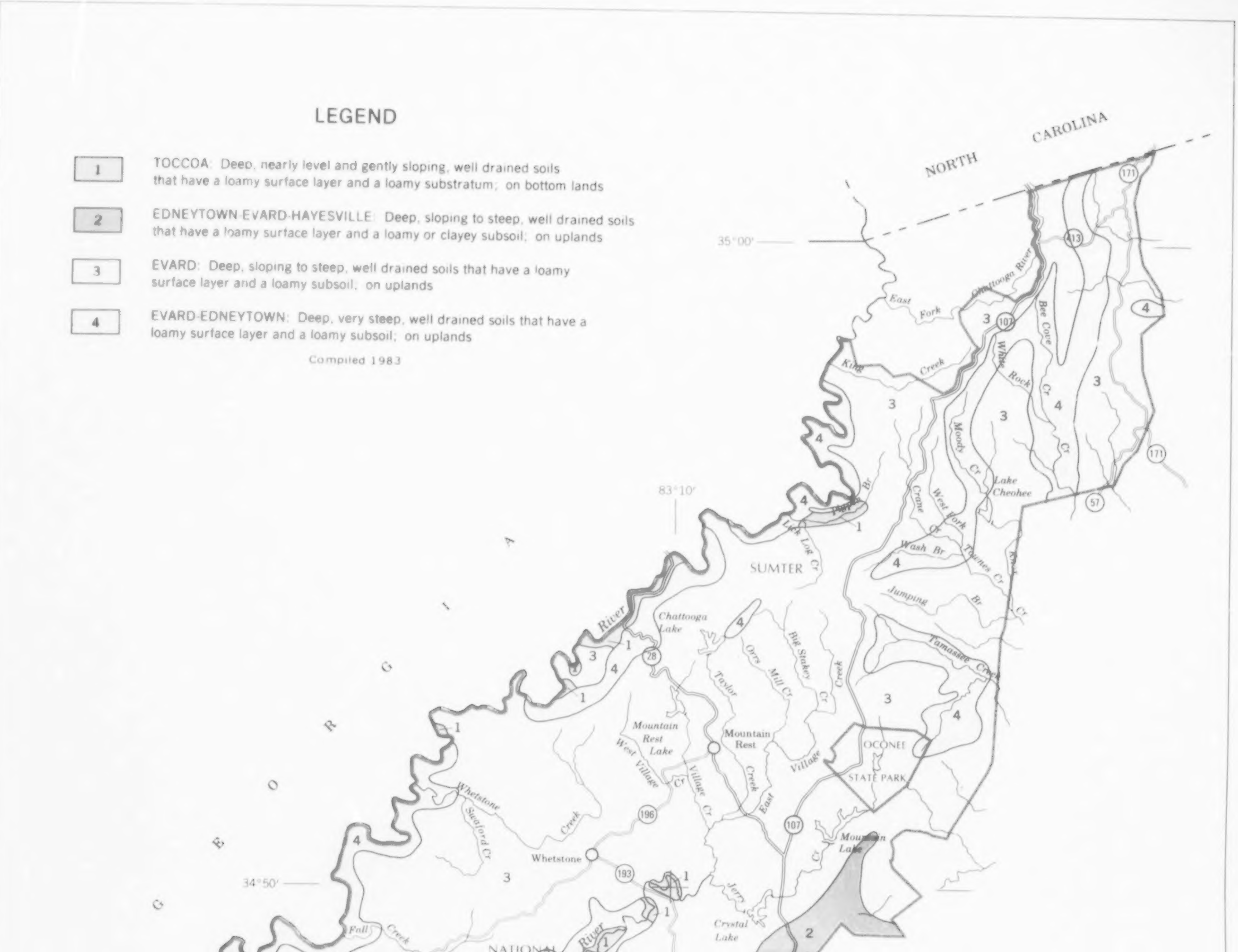
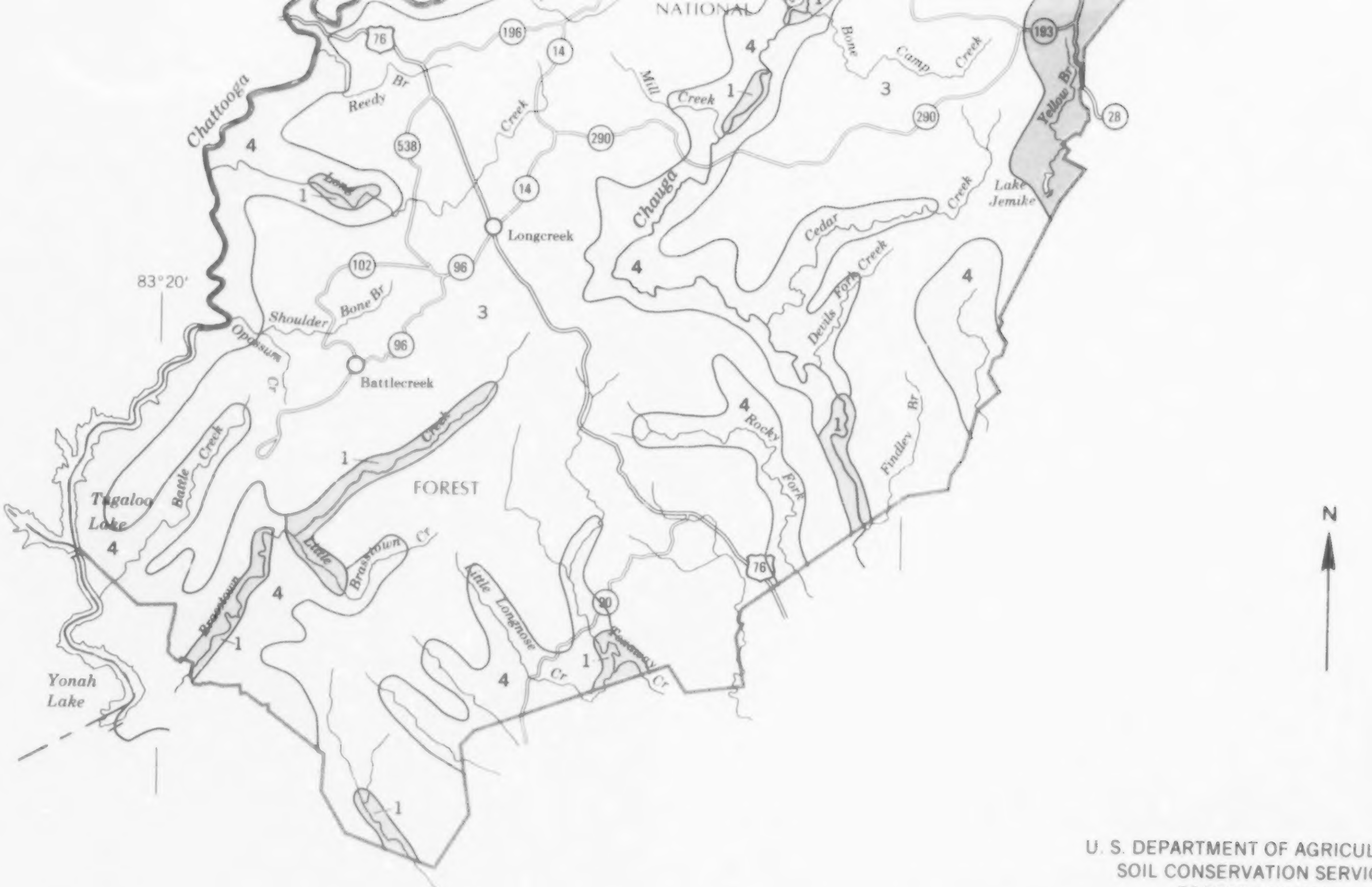

NORTH CAROLINA
GEORGIA
SUMTER
NATIONAL
35°00′
83°10′
34°50′
Chattooga River
East Fork
King Creek
Bee Cove Cr
White Rock Cr
Moody Cr
Lake Cheohee
Crane Cr
West Fork
Wash Br
Townes Cr
Jumping Br
Tamassee Creek
Lick Log Cr
Chattooga Lake
Big Stakey Cr
Orrs Mill Cr
Taylor
Creek
Mountain Rest Lake
Mountain Rest
West Village Cr
Village Cr
East Village Creek
OCONEE STATE PARK
Mountain Lake
Jerry Cr
Crystal Lake
Whetstone
Whetstone Creek
Swaford Cr
Fall Creek
River
107
413
171
57
28
196
193

LEGEND

1	TOCCOA: Deep, nearly level and gently sloping, well drained soils that have a loamy surface layer and a loamy substratum; on bottom lands
2	EDNEYTOWN-EVARD-HAYESVILLE: Deep, sloping to steep, well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands
3	EVARD: Deep, sloping to steep, well drained soils that have a loamy surface layer and a loamy subsoil; on uplands
4	EVARD-EDNEYTOWN: Deep, very steep, well drained soils that have a loamy surface layer and a loamy subsoil; on uplands

Compiled 1983


NATIONAL
FOREST
Chattooga
Reedy Br
Creek
Mill Creek
Bone
Camp Creek
Yellow Br
Lake Jemike
Chauga
Cedar Creek
Devils Fork Creek
Rocky Fork
Findley Br
Longcreek
Battlecreek
Shoulder Bone Br
Opossum Cr
Battle Creek
Tugaloo Lake
Little Brasstown Cr
Creek
Brasstown
Little Longnose Cr
Cr
Yonah Lake
83°20'
N
76
196
14
290
193
28
538
102
96
90
1
3
4

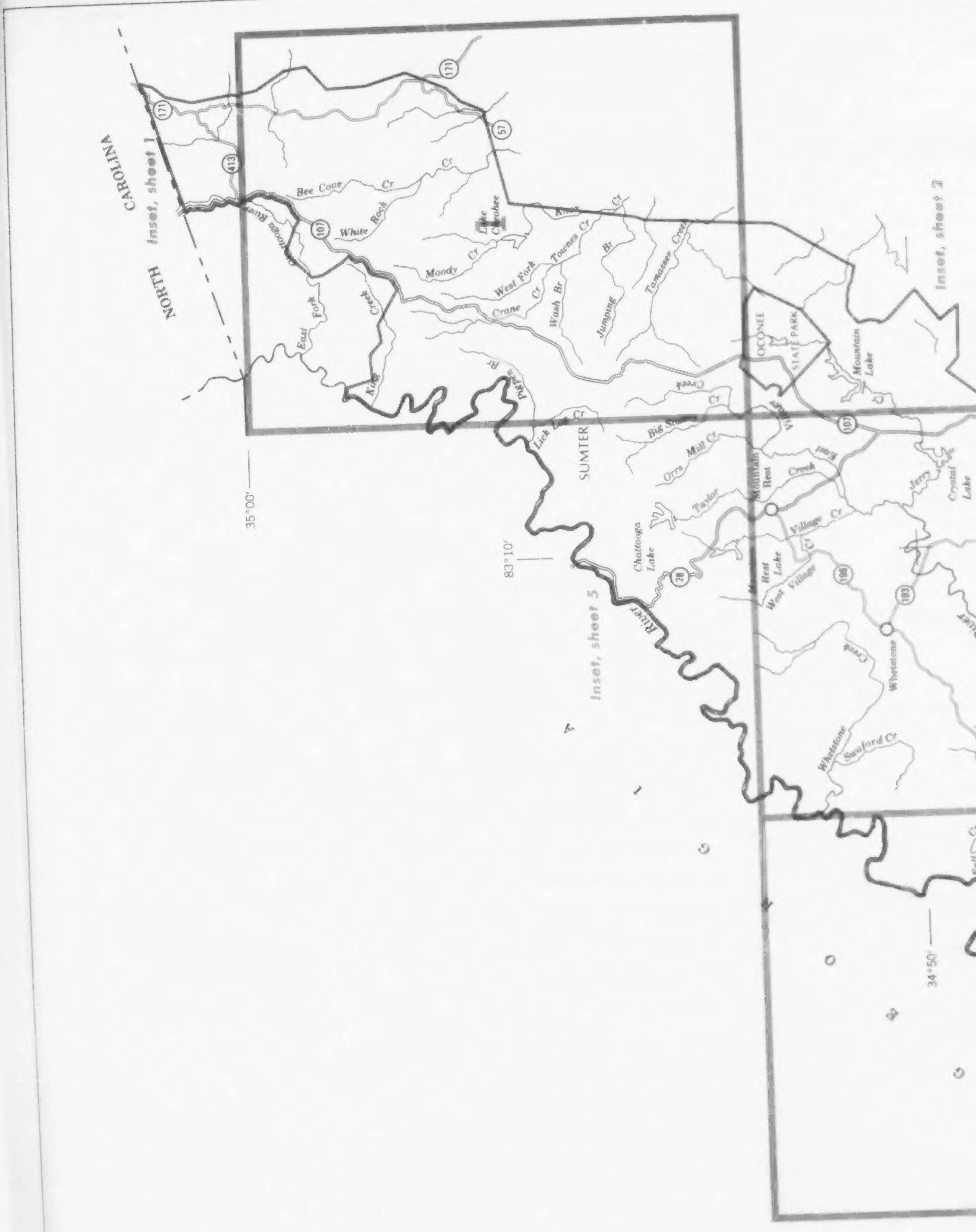
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION
SOUTH CAROLINA LAND RESOURCES CONSERVATION COMMISSION

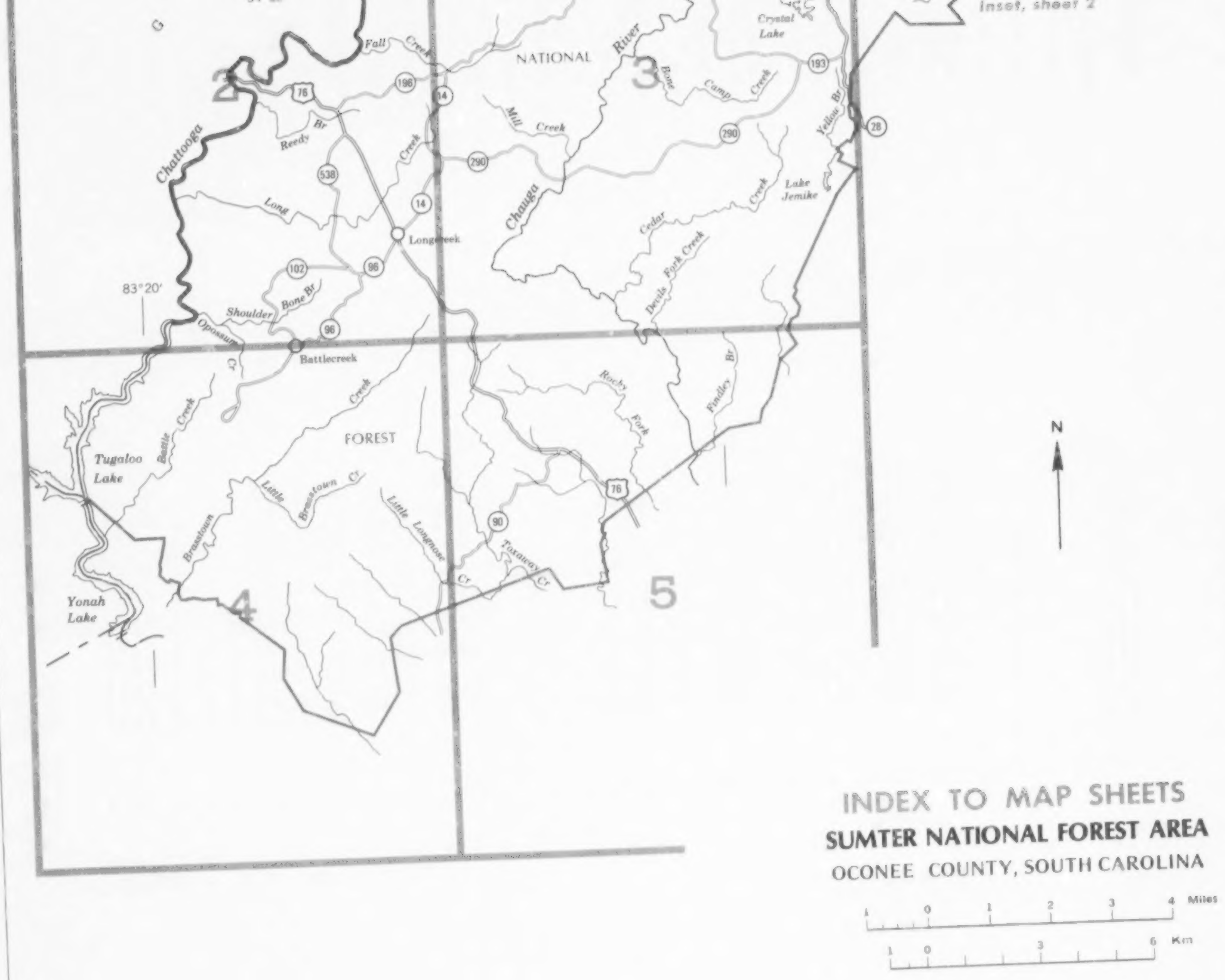
GENERAL SOIL MAP
SUMTER NATIONAL FOREST AREA
OCONEE COUNTY, SOUTH CAROLINA

1 0 1 2 3 4 Miles

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.


NORTH CAROLINA
Inset, sheet 1
Inset, sheet 2
Inset, sheet 5
171
57
413
107
28
196
193
Bee Cove Cr
White Rock
Chattooga River
Lake Cheohee
Moody Cr
West Fork
Townes Cr
Crane Cr
Wash Br
Jumping Br
Tamassee Creek
East Fork
King Creek
Pigpen Br
Lick Log Cr
Big Shoals Cr
Orrs Mill Cr
Taylor
OCONEE STATE PARK
Mountain Lake
Mountain Rest
Village Cr
East Creek
Jerry
Crystal Lake
SUMTER
Chattooga Lake
Rest Lake
West Village Cr
River
Whetstone
Whetstone Creek
Swafford Cr
G E O R G I A
35°00′
83°10′
34°50′


Inset, sheet 2
Crystal Lake
Fall Creek
NATIONAL
River
3
Bone
Camp Creek
193
2
76
196
14
Mill Creek
Yellow Br
28
Chattooga
Reedy Br
Creek
290
538
Long
14
Chauga
Lake Jemike
Creek
Cedar
Devils Fork Creek
Longcreek
102
96
83°20'
Shoulder
Bone Br
Opossum Cr
96
Battlecreek
Rocky Fork
Findley Br
Battle Creek
Creek
FOREST
Tugaloo Lake
Little Brasstown Cr
Little Longnose Cr
76
90
Brasstown
Toxaway Cr
Yonah Lake
4
5
N
1 0 1 2 3 4 Miles
1 0 3 6 Km

INDEX TO MAP SHEETS

SUMTER NATIONAL FOREST AREA

OCONEE COUNTY, SOUTH CAROLINA

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SUMTER NATIONAL FOREST ARE

SOIL LEGEND

The capital letters following the numerals designate slopes and where a letter is absent the predominant slope gradient is less than 2 percent. This complete survey was mapped as an Order 2 soil survey

ALPHABETICAL LISTING

SYMBOL	NAME
7C	Brevard fine sandy loam, 7 to 15 percent slopes
7E	Brevard fine sandy loam, 15 to 50 percent slopes
3B	Edneytown fine sandy loam, 2 to 7 percent slopes
3C	Edneytown fine sandy loam, 7 to 15 percent slopes
3D	Edneytown fine sandy loam, 15 to 25 percent slopes
3E	Edneytown fine sandy loam, 25 to 50 percent slopes
3F	Edneytown fine sandy loam, 50 to 80 percent slopes
18F	Edneytown-Saluda association, 50 to 80 percent slopes
6C	Evard fine sandy loam, 7 to 15 percent slopes
6D	Evard fine sandy loam, 15 to 25 percent slopes
6E	Evard fine sandy loam, 25 to 50 percent slopes
6F	Evard fine sandy loam, 50 to 80 percent slopes
21B	Hayesville very fine sandy loam, 2 to 7 percent slopes
21C	Hayesville very fine sandy loam, 7 to 15 percent slopes
21D	Hayesville very fine sandy loam, 15 to 25 percent slopes
21E	Hayesville very fine sandy loam, 25 to 50 percent slopes
12	Toccoa fine sandy loam
13	Transylvania loam
9B	Walhalla fine sandy loam, 2 to 7 percent slopes
9C	Walhalla fine sandy loam, 7 to 15 percent slopes
9D	Walhalla fine sandy loam, 15 to 25 percent slopes
9E	Walhalla fine sandy loam, 25 to 50 percent slopes

NUMERICAL LISTING

3B	Edneytown fine sandy loam, 2 to 7 percent slopes
3C	Edneytown fine sandy loam, 7 to 15 percent slopes
3D	Edneytown fine sandy loam, 15 to 25 percent slopes
3E	Edneytown fine sandy loam, 25 to 50 percent slopes
3F	Edneytown fine sandy loam, 50 to 80 percent slopes
6C	Evard fine sandy loam, 7 to 15 percent slopes
6D	Evard fine sandy loam, 15 to 25 percent slopes
6E	Evard fine sandy loam, 25 to 50 percent slopes
6F	Evard fine sandy loam, 50 to 80 percent slopes
7C	Brevard fine sandy loam, 7 to 15 percent slopes
7E	Brevard fine sandy loam, 15 to 50 percent slopes
9B	Walhalla fine sandy loam, 2 to 7 percent slopes
9C	Walhalla fine sandy loam, 7 to 15 percent slopes
9D	Walhalla fine sandy loam, 15 to 25 percent slopes
9E	Walhalla fine sandy loam, 25 to 50 percent slopes
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21C	Hayesville very fine sandy loam, 7 to 15 percent slopes
21D	Hayesville very fine sandy loam, 15 to 25 percent slopes
21E	Hayesville very fine sandy loam, 25 to 50 percent slopes

OCONEE COUNTY, SOUTH CAROLINA

FOREST SERVICE
SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION AND
SOUTH CAROLINA LAND RESOURCES CONSERVATION COMMISSION

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) — Hedley Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants) └ ┴ + ┼

OADS

- Divided (median shown if scale permits)
- Other roads
- Trail

OAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

AILROAD

OWER TRANSMISSION LINE (normally not shown)

PE LINE (normally not shown)

ENCE (normally not shown)

EVEES

- Without road
- With road
- With railroad

AMS

- Large (to scale)
- Medium or small — water

TS — w

- Gravel pit ⚒
- Mine or quarry ⚒

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas) ■
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower ○
- Tank (label) — Gas ●
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CnB WaC2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK ◊

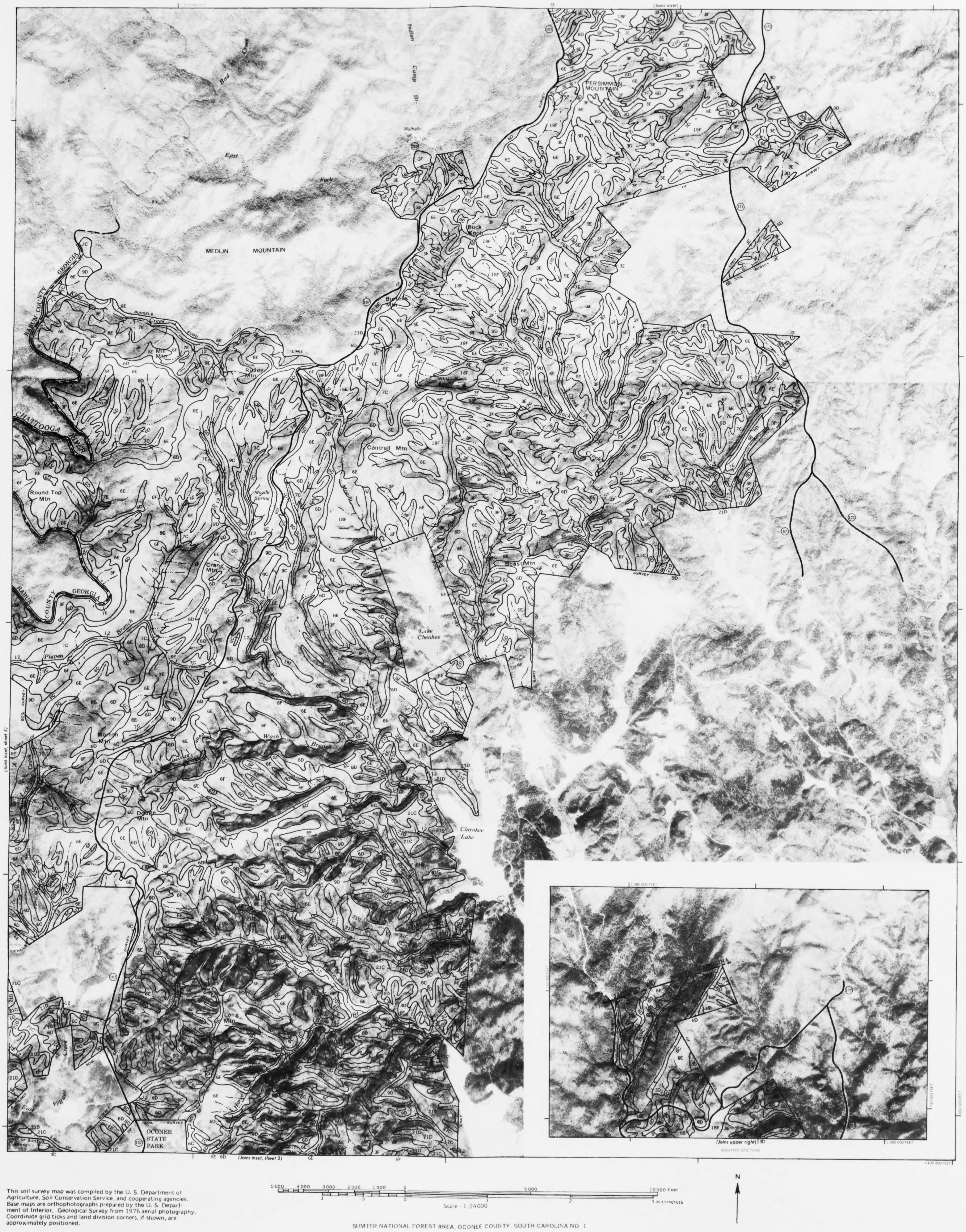
SOIL SAMPLE SITE (normally not shown) Ⓢ

MISCELLANEOUS

- Blowout
- Clay spot ✳
- Gravelly spot
- Gumbo, slick or scabby spot (sodic) ø
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot +
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Ponds (as much as 2 acres)
- Alluvial/Colluvial fans (as much as 2 acres)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 1
SUMTER NATIONAL FOREST AREA, SOUTH CAROLINA


(Joins inset)
Bad Creek
Indian Camp Br
East Fork
Walhalla
MEDLIN MOUNTAIN
PERSIMMON MOUNTAIN
Buck Knob
GEORGIA
RABUN COUNTY
CHATTOOGA RIVER
Mill Mtn
Ridley Mtn
Cantrell Mtn
Round Top Mtn
Moody Spring
Crane Mtn
Boast Mtn
Lake Cheohee
Pigpen Branch
Morton Mtn
Wash Branch
Dodge Mtn
Cherokee Lake
Long Mtn
Village Creek
OCONEE STATE PARK
(Joins inset, sheet 5)
(Joins inset, sheet 2)
(Joins upper right)
LIMIT OF SOIL SURVEY

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

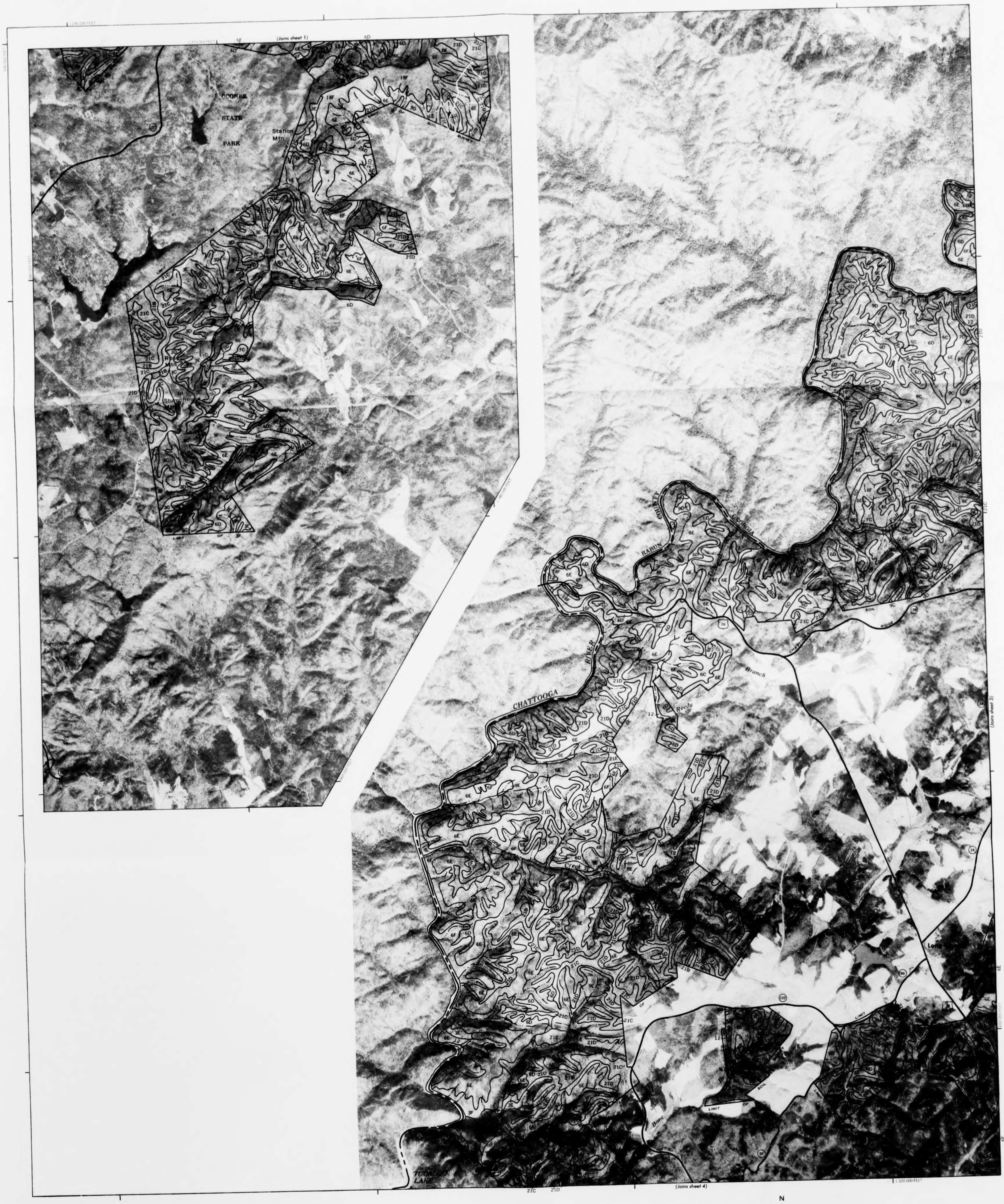
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale 1:24 000

N

SUMTER NATIONAL FOREST AREA, OCONEE COUNTY, SOUTH CAROLINA NO. 1

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 2
SUMTER NATIONAL FOREST AREA, SOUTH CAROLINA


(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 4)
OCONEE STATE PARK
Station Mtn
Stumphouse Mtn
CHATTOOGA RIVER
RABUN COUNTY
GEORGIA
Reedy Branch
Long Creek
TUGALOO LAKE
LIMIT OF SOIL SURVEY
21C
21D
6D
6E
6F
9C
9D
12
18F

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

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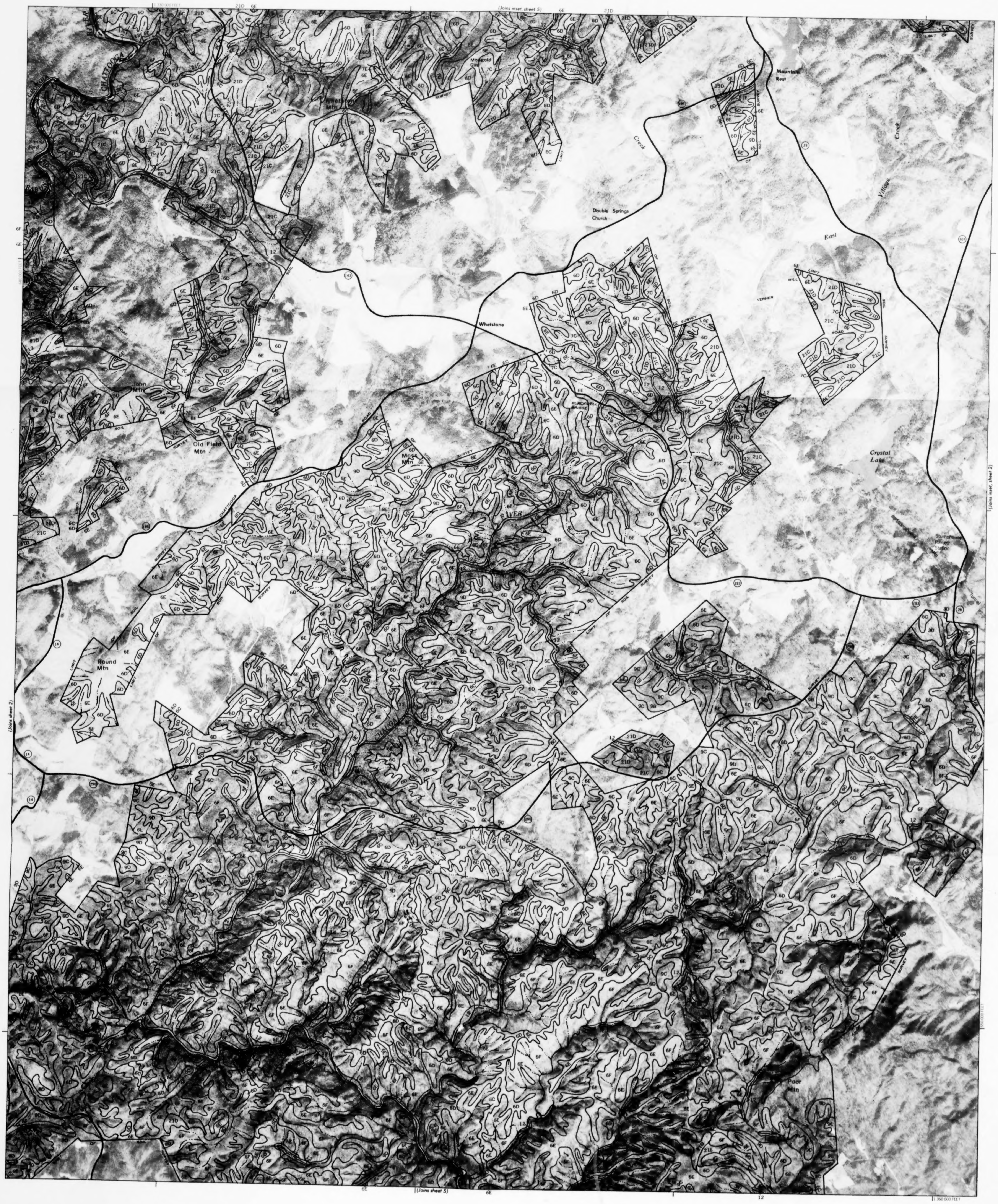
SUMTER NATIONAL FOREST AREA, OCONEE COUNTY, SOUTH CAROLINA NO. 2

SHEET NO. 2 OF 5

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 3
SUMTER NATIONAL FOREST AREA, SOUTH CAROLINA


(Joins inset, sheet 5)
(Joins sheet 2)
(Joins inset, sheet 2)
(Joins sheet 5)
1 360 000 FEET
Chattooga River
Whetstone Mtn
Double Springs Church
Mountain Rest
Crystal Lake
East Village Creek
Whetstone
Old Field Mtn
Moss Mtn
Round Mtn
Poor Mtn
Blackwell Bridge
LIMIT OF SOIL SURVEY
6E
6D
21D
21C
7C
9C
12
N

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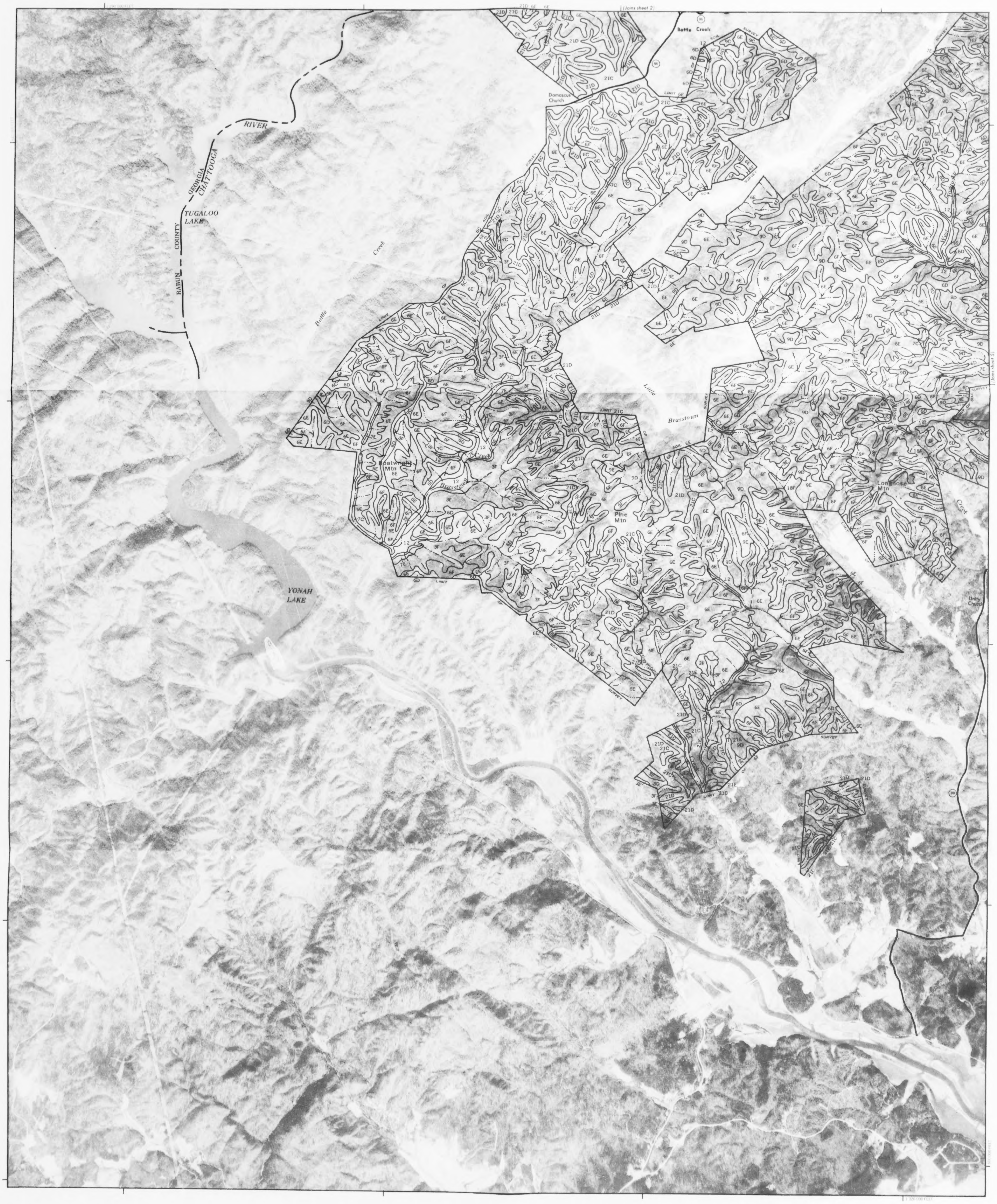
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

SUMTER NATIONAL FOREST AREA, OCONEE COUNTY, SOUTH CAROLINA NO. 3

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 4
SUMTER NATIONAL FOREST AREA, SOUTH CAROLINA


(Joins sheet 2)
Battle Creek
Damascus Church
RIVER
GEORGIA
CHATTOOGA
TUGALOO LAKE
RABUN COUNTY
Battle Creek
Little Brasstown
Boatwright Mtn
Brasstown
Pine Mtn
Longnose Mtn
Creek
YONAH LAKE
(Joins sheet 5)
SOIL SURVEY LIMIT
21D
21C
6E
6F
6D
9D
9E
12
3F
7C
18F

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

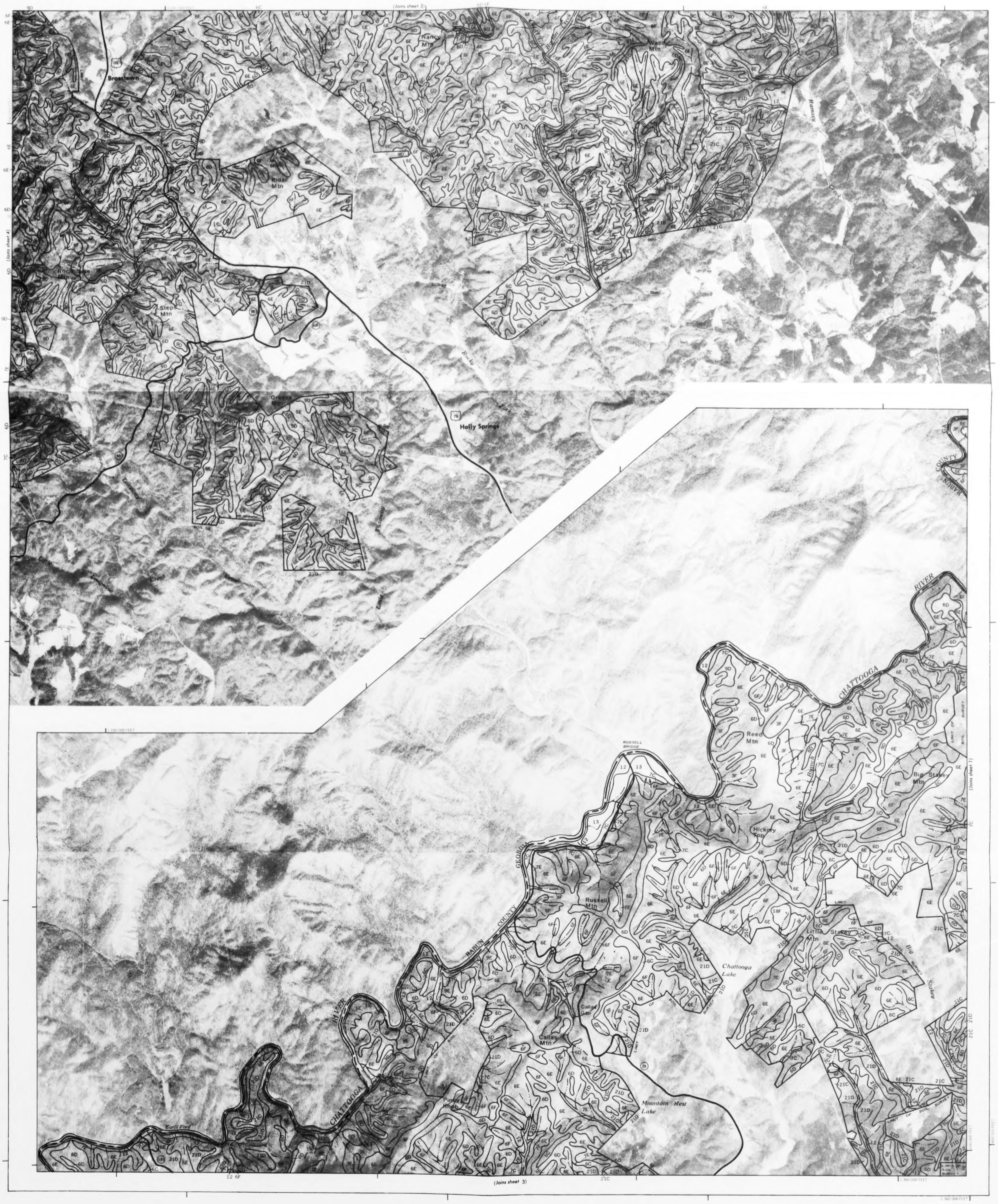
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

SUMTER NATIONAL FOREST AREA, OCONEE COUNTY, SOUTH CAROLINA NO. 4

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 5
SUMTER NATIONAL FOREST AREA SOUTH CAROLINA


(Joins sheet 3)
(Joins sheet 4)
(Joins sheet 1)
Brasstown
Ridge Mtn
Nancy Long Mtn
Wells Mtn
Step Mtn
Grassy Mtn
Holly Springs
Rocky
Ramsey
Little
RUSSELL BRIDGE
Reed Mtn
Hickory Top
Ira Branch
Big Stakey Mtn
Little Stakey Mtn
Big Stakey
Russell Mtn
Chattooga Lake
Callas Mtn
Mountain Rest Lake
Pinnacle Knob
Burrs Ford
CHATTOOGA RIVER
RABUN COUNTY
GEORGIA
GA
LIMIT OF SOIL SURVEY
1 330 000 FEET
1 360 000 FEET
12 6F
21C
7C

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

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SUMTER NATIONAL FOREST AREA, OCONEE COUNTY, SOUTH CAROLINA NO. 5